South Fork Clearwater River Subbasin *Escherichia coli* Total Maximum Daily Loads and Review

2020

Hydrologic Unit Code 17060305

State of Idaho
Department of Environmental Quality
December 2020

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Acknowledgments

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Prepared by
Jason Williams
Idaho Department of Environmental Quality
Lewiston Regional Office
1118 F St
Lewiston, ID, 83501

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Abbreviations, Acronyms, and Symbols

§	section (usually a section of federal or state rules or statutes)
§303(d)	refers to section 303 subsection (d) of the Clean Water Act, or a list of impaired water bodies required by this section
AU	assessment unit
BMP	best management practice
CFR	Code of Federal Regulations (refers to citations in the federal administrative rules)
cfs	cubic feet per second
DEQ	Idaho Department of Environmental Quality
EPA	United States Environmental Protection Agency
ft^3	cubic feet
HUC	hydrologic unit code
IDAPA	Refers to citations of Idaho administrative rules
Idaho SWCD	Idaho County Soil & Water Conservation District
IPDES	Idaho Pollutant Discharge Elimination System
ISWCC	Idaho Soil and Water Conservation Commission
LA	load allocation
LC	load capacity
mL	milliliter
mpn	most probable number
MOS	margin of safety
NB	natural background
NPDES	National Pollutant Discharge Elimination System
NPTWR	Nez Perce Tribe Water Resources
PCR	primary contact recreation
SBA	subbasin assessment
SCR	secondary contact recreation
TMDL	total maximum daily load
US	United States
USC	United States Code
WAG	watershed advisory group
WLA	wasteload allocation
WWTP	Waste Water Treatment Plant

Executive Summary

The federal Clean Water Act (CWA) requires that states and tribes restore and maintain the chemical, physical, and biological integrity of the nation's waters. States and tribes, pursuant to CWA §303, are to adopt water quality standards necessary to protect fish, shellfish, and wildlife while providing for recreation in and on the nation's waters whenever possible.

The CWA §303(d) establishes requirements for states and tribes to identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). States and tribes must periodically publish a priority list (a "§303(d) list") of impaired waters. Currently, Idaho publishes this list every 2 years as the list of Category 5 water bodies in Idaho's Integrated Report.

For waters identified on this list, the CWA requires states and tribes to develop a total maximum daily load (TMDL) for each pollutant, set at a level to achieve water quality standards. A TMDL specifies maximum inputs of a pollutant from all sources that can occur while still meeting state water quality standards. The US Environmental Protection Agency (EPA) must review and approve TMDLs for them to go into effect.

This document develops *Escherichia coli* (*E. coli*) TMDLs for five stream segments (i.e., assessment units [AUs]) in the South Fork Clearwater River subbasin (hydrologic unit code [HUC] 17060305), where DEQ determined *E. coli* concentrations exceed Idaho's *E. coli* water quality standard (IDAPA 58.01.02.251.01a) and impair stream recreation use (Table A). The Idaho Department of Environmental Quality (DEQ) previously identified three of these five AUs (Cottonwood, Stockney, and Shebang Creeks) as exceeding Idaho's fecal coliform water quality criterion and developed fecal coliform TMDLs (DEQ 2000). In 2000, Idaho's water quality standards changed; the fecal coliform criterion was replaced with an *E. coli* criterion. Recent monitoring indicated the *E. coli* criterion is exceeded, so *E. coli* TMDLs were developed to replace the fecal coliform TMDLs. DEQ developed an *E. coli* TMDL for two additional AUs (Sally Ann Creek and tributaries) where no fecal coliform or *E. coli* data were previously available, but recent monitoring results exceeded the *E. coli* criterion. In addition, DEQ conducted a TMDL review required by Idaho Code §39-3611(7) for Threemile Creek, where an *E. coli* TMDL was previously developed (DEQ 2004).

Table A. Summary of outcomes for assessment units where *E. coli* TMDLs were developed.

Assessment Unit Name	Assessment Unit Number	Pollutant	TMDL Completed	Recommended Changes to 2022 Integrated Report	Justification
Cottonwood Creek—source to Cottonwood Creek waterfall[a]	003_04	*E. coli*	Yes	Place primary contact recreation use in IR Category 4a (impaired with approved TMDL) due to *E. coli* impairment.	*E. coli* impairment identified and TMDL completed. *E. coli* TMDL replaces 2000 fecal coliform TMDL.
Stockney Creek—source to mouth[a]	006_03	*E. coli*	Yes	Place secondary contact recreation use in IR Category 4a (impaired with approved TMDL) due to *E. coli* impairment.	*E. coli* impairment identified and TMDL completed. *E. coli* TMDL replaces 2000 fecal coliform TMDL.
Shebang Creek—source to mouth[a]	007_03	*E. coli*	Yes	Place secondary contact recreation use in IR Category 4a (impaired with approved TMDL) due to *E. coli* impairment.	*E. coli* impairment identified and TMDL completed. *E. coli* TMDL replaces 2000 fecal coliform TMDL.
Sally Ann Creek—source to and including. Wall Creek[b]	081_02	*E. coli*	Yes	Place secondary contact recreation use in IR Category 4a (impaired with approved TMDL) due to *E. coli* impairment.	*E. coli* impairment identified and TMDL completed.
Sally Ann Creek—Wall Creek to mouth[c]	081_03	*E. coli*	Yes	Place secondary contact recreation use in IR Category 4a (impaired with approved TMDL) due to *E. coli* impairment.	New *E. coli* impairment identified and TMDL completed; unlisted but impaired.
Threemile Creek—source to unnamed tributary[d]	010_02	*E. coli*	No (TMDL review)	Keep secondary contact recreation use in IR Category 4a (impaired with approved TMDL) due to *E. coli* impairment.	AU is still impaired by *E. coli,* and existing TMDL is still appropriate.

NOTE: all SF Clearwater assessment unit numbers begin with 'ID17060305CL', and have been shortened to promote readability.
a. Fecal coliform TMDL previously developed in *Cottonwood Creek Total Maximum Daily Load (TMDL)* (DEQ 2000); this document updates the fecal coliform TMDL to an *E. coli* TMDL.
b: contact recreation use newly listed as impaired by *E. coli* (Category 5) in Idaho's 2018/2020 Integrated Report.
c. contact recreation use unassessed in Idaho's 2018/2020 Integrated Report. AU recently identified as impaired based on 2020 monitoring data and TMDL developed.
d. Existing *E. coli* TMDL developed in the *South Fork Clearwater River Subbasin Total Maximum Daily Loads* (DEQ 2004); this document reviews the existing *E. coli* TMDL for the AU as required by Idaho Code.

This document describes the key physical and biological characteristics of the subbasin; water quality concerns and status; pollutant sources; and recent pollution control actions in the South Fork Clearwater River subbasin, located in north-central Idaho. For more detailed information about the subbasin and previous TMDLs, see the *Cottonwood Creek Total Maximum Daily Load (TMDL)* (DEQ 2000) and *South Fork Clearwater River Subbasin Assessment and TMDLs* (DEQ 2004).

The TMDL analysis establishes water quality targets and load capacities, estimates existing pollutant loads, and allocates responsibility for load reductions needed to return listed waters to a condition meeting water quality standards. It also identifies implementation strategies—

including reasonable time frames, approach, responsible parties, and monitoring strategies—necessary to achieve load reductions and meet water quality standards.

Subbasin at a Glance

The South Fork Clearwater River subbasin is located in north-central Idaho (Figure A).

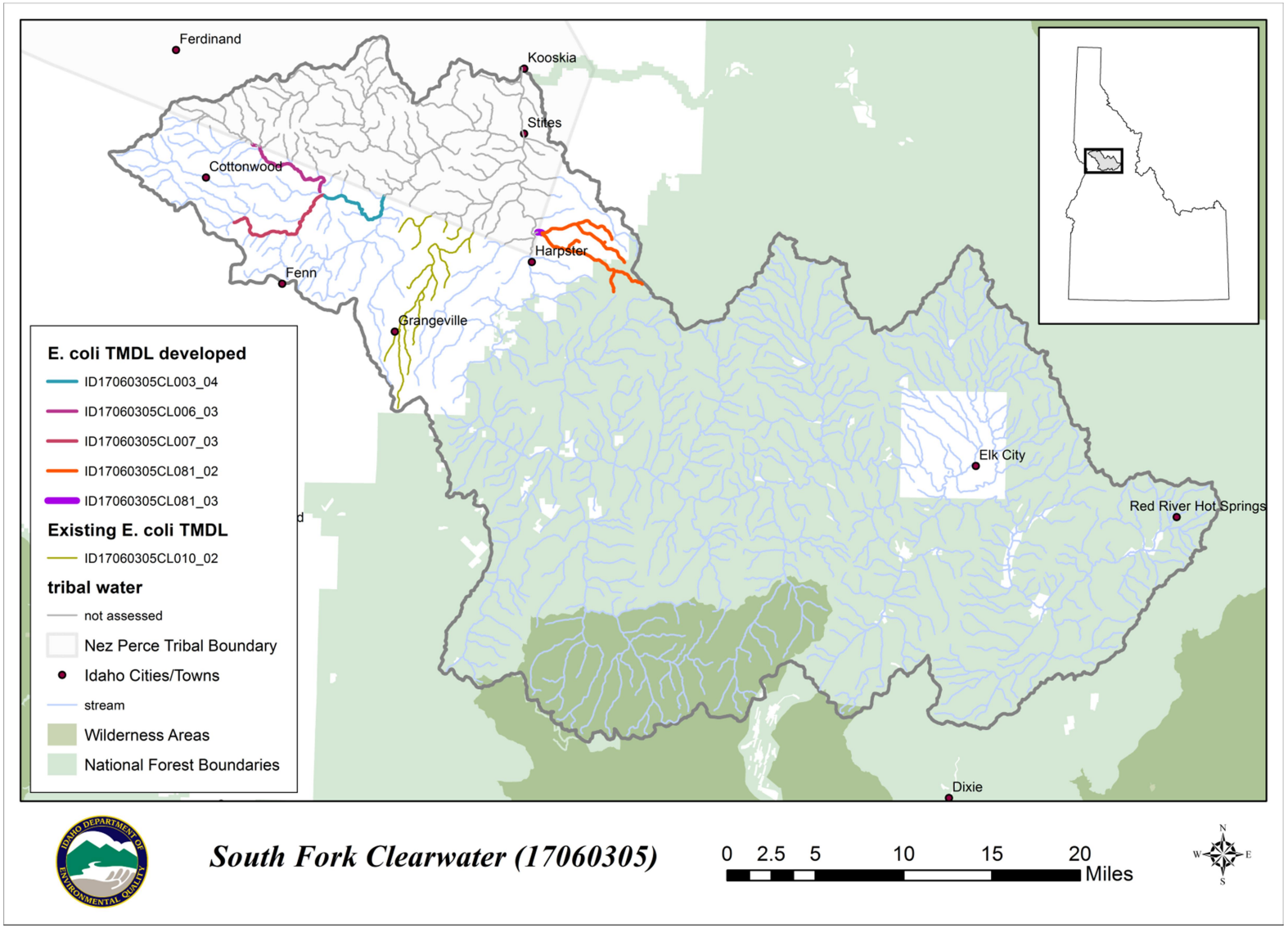

Figure A. South Fork Clearwater River subbasin and streams evaluated.

Key Findings

The key findings are as follows:

- Between 2017 and 2019, DEQ collected *E. coli* data at 72 sites across 62 AUs within the South Fork Clearwater River watershed; all sites were outside the Nez Perce Reservation boundary. Monitoring methods and results are documented in detail the *Escherichia coli Patterns in the South Fork Clearwater River Subbasin* (DEQ 2020). Based on available data, DEQ identified six AUs where *E. coli* concentrations exceeded Idaho's *E. coli* criterion (IDAPA 58.01.02.251.01a), and DEQ determined contact recreation use is impaired. Table A lists the six AUs.
- DEQ's contact recreation use support decisions for all 62 AUs monitored in 2017–2019 are documented in *Idaho's 2018/2020 Integrated Report* (DEQ 2020a), which was approved by EPA in October 2020 (EPA 2020) during the public comment period for this document (Appendix D). The CWA requires EPA to review and approve state beneficial use support decisions by reviewing and approving the Integrated Report. This document focuses on the six AUs where DEQ determined contact recreation use is impaired by *E. coli*.
- Three of the six AUs (Cottonwood Creek [ID17060305CL003_04], Stockney Creek [ID17060305CL006_03], and Shebang Creek [ID17060305CL007_03]) had fecal coliform TMDLs developed in the Cottonwood Creek TMDL (DEQ 2000). Idaho's water quality standards subsequently changed, and the fecal coliform criterion was replaced with an *E. coli* criterion. Recent monitoring indicated these AUs are impaired by *E. coli,* and so *E. coli* TMDLs were developed to replace the fecal coliform TMDLs.
- For two of the six AUs, (Sally Ann Creek [ID17060305CL081_02 and ID17060305CL081_03]), contact recreation use had not been assessed prior to the 2018/2020 Integrated Report. Recent *E. coli* results exceeded Idaho's *E. coli* standard, so DEQ developed an *E. coli* TMDL for each AU.
- The *E. coli* TMDLs were designed to achieve Idaho's *E. coli* criterion and restore support of contact recreation uses. Idaho's *E. coli* water quality criterion was selected as the TMDL target concentration. The target concentration and measured stream flows were used to define load capacities. All *E. coli* inputs were attributed to nonpoint sources for the five AUs where new *E. coli* TMDLs were developed.
- For Threemile Creek (AU ID17060305CL010_02), DEQ previously developed an *E. coli* TMDL in the *South Fork Clearwater River Subbasin Assessment and Total Maximum Daily Loads* (DEQ 2004). For this AU, DEQ conducted a TMDL review as required by Idaho Code §39-3611(7). DEQ believes the existing *E. coli* TMDL for the Threemile Creek is still appropriate; Idaho's *E. coli* criterion is still exceeded, and the TMDL does not need to be revised.

To address *E. coli* pollution, DEQ recommends that DEQ, Nez Perce Tribe Water Resources, Idaho County Soil & Water Conservation District, and Idaho Soil and Water Conservation Commission collaboratively develop an interagency monitoring plan. Two types of monitoring are needed: *pollutant characterization* monitoring to better characterize pollutant sources, their relative contribution, trends, and spatial distribution to guide implementation efforts; and *implementation effectiveness* monitoring that documents pollutant reductions from specific implementation projects by monitoring pollutants before and after project completion. Detailed

information is needed to guide implementation efforts and maximize water quality benefits from limited financial resources available. Approximately 4 million dollars of grant funds have been spent on bacteria pollution control efforts in this subbasin. Some improvement has occurred, but *E. coli* patterns remain largely unchanged across years at some sites where multiple years of monitoring data are available.

Public Participation

A draft version of this document was distributed to the South Fork Clearwater Watershed Advisory Group (WAG) in March 2020. The draft was discussed with the South Fork Clearwater WAG in public meetings on 8/26/2020, 9/9/2020, and 9/23/2020. The public comment period for this document was open from October 9 to November 9, 2020. Public comments and DEQ responses are included in Appendix D.

Introduction

This document develops *Escherichia coli* (*E. coli*) TMDLs for five assessment units (AUs) in the South Fork Clearwater River subbasin (hydrologic unit code [HUC] 17060305). The purpose of a total maximum daily load (TMDL) is to characterize and document pollutant loads within the subbasin. The first portion of this document presents key characteristics or updated information for the subbasin assessment, which is divided into four major sections: subbasin characterization (section 1), water quality concerns and status (section 2), pollutant source inventory (section 3), and a summary of past and present pollution control efforts (section 4). While the subbasin assessment is not a requirement of the TMDL, DEQ performs the assessment to ensure impairment listings are up to date and accurate.

The subbasin assessment is used to develop *E. coli* TMDLs for five AUs within the South Fork Clearwater River subbasin. The TMDL (section 5) is a plan to improve water quality by limiting pollutant loads. Specifically, a TMDL is an estimation of the maximum pollutant amount that can be present in a water body and still allow that water body to meet water quality standards (40 CFR 130). Consequently, a TMDL is water body- and pollutant-specific. The TMDL also allocates allowable discharges of individual pollutants among the various sources discharging the pollutant. Section 6 of this document also presents a TMDL review required by Idaho Code §39-3611(7) for Threemile Creek, where an *E. coli* TMDL was previously developed in the *South Fork Clearwater River Subbasin Assessment and Total Maximum Daily Loads* (DEQ 2004).

Regulatory Requirements

This document was prepared in compliance with both federal and state regulatory requirements. The federal government, through the United States Environmental Protection Agency (EPA), assumed the dominant role in defining and directing water pollution control programs across the country. The Idaho Department of Environmental Quality (DEQ) implements the Clean Water Act (CWA) in Idaho, while EPA oversees Idaho and certifies the fulfillment of CWA requirements and responsibilities.

Congress passed the Federal Water Pollution Control Act, or CWA more commonly called the Clean Water Act, in 1972. The goal of this act was to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (33 USC §1251). The act and the programs it has generated have changed over the years as experience and perceptions of water quality have changed. The CWA has been amended 15 times, most significantly in 1977, 1981, and 1987. One of the goals of the 1977 amendment was protecting and managing waters to ensure "swimmable and fishable" conditions. These goals relate water quality to more than just chemistry.

The CWA requires that states and tribes restore and maintain the chemical, physical, and biological integrity of the nation's waters. States and tribes, pursuant to the CWA §303, are to adopt water quality standards necessary to protect fish, shellfish, and wildlife while providing for recreation in and on the nation's waters whenever possible. DEQ must review those standards every 3 years, and EPA must approve Idaho's water quality standards. Idaho adopts water quality standards to protect public health and welfare, enhance water quality, and protect biological integrity. A water quality standard defines the goals of a water body by designating the use or

uses for the water, setting criteria necessary to protect those uses, and preventing degradation of water quality through antidegradation provisions.

The CWA §303(d) establishes requirements for states and tribes to identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). States and tribes must periodically publish a priority list (a "§303(d) list") of impaired waters. Currently, this list is published every 2 years as the list of Category 5 waters in Idaho's Integrated Report. For waters identified on this list, states and tribes must develop a TMDL for the pollutants, set at a level to achieve water quality standards.

DEQ monitors waters, and for those not meeting water quality standards, DEQ must establish a TMDL for each pollutant impairing the waters. However, some conditions that impair water quality do not require TMDLs. EPA considers certain unnatural conditions—such as flow alteration, human-caused lack of flow, or habitat alteration—that are not the result of discharging a specific pollutant as "pollution." TMDLs are not required for water bodies impaired by pollution, rather than by a specific pollutant. A TMDL is only required when a pollutant can be identified and in some way quantified.

Assessment Units

To assess if water quality standards are met, beneficial uses are supported, and to fulfill CWA §303(d) and §305(b) reporting requirements, DEQ subdivides surface water bodies into assessment units (AUs). AUs are groups of similar streams within similar land use practices, ownership, or land management. AUs are based on Strahler stream order (Strahler 1957), although additional factors such as land use, landscape physical characteristics, and local knowledge may be considered. Using AUs to describe water bodies offers many benefits, including that all waters of the state are defined consistently. AUs are a subset of water body identification numbers used to specify beneficial uses, which relates them directly to Idaho's water quality standards. A detailed description of how DEQ subdivides surface waters into AUs is provided in *Idaho's 2016 Integrated Report* (DEQ 2018). The South Fork Clearwater River subbasin includes 147 AUs.

1 Subbasin Characterization

The South Fork Clearwater River is a 5th-order river that drains approximately 1,175 square miles within Idaho County, Idaho (Figure 1). The watershed extends from the headwaters above Elk City, Idaho (6,382 feet) to the confluence with the Middle Fork Clearwater River at Kooskia, Idaho (elevation 1,280 feet) (DEQ 2004). Most of the watershed upstream from Harpster, Idaho, is within the boundaries of the Nez Perce-Clearwater National Forest (Figure 1 and Figure 2). The lower 12.8 miles of the South Fork Clearwater River main stem flow through the Nez Perce Reservation, with approximately 11% of total watershed area (approximately 131 square miles) within the reservation (DEQ 2004). Most of this lower watershed area falls within the Camas Prairie, characterized by relatively flat topography, dryland farming land use, and basalt geology, whereas the upper watershed is more topographically complex, primarily forest, and has schist and gneiss, quartzite, and granitic underlying geology. Watershed physical and biological

characteristics are described in detail within two TMDL documents previously developed for the watershed (DEQ 2000, DEQ 2004).

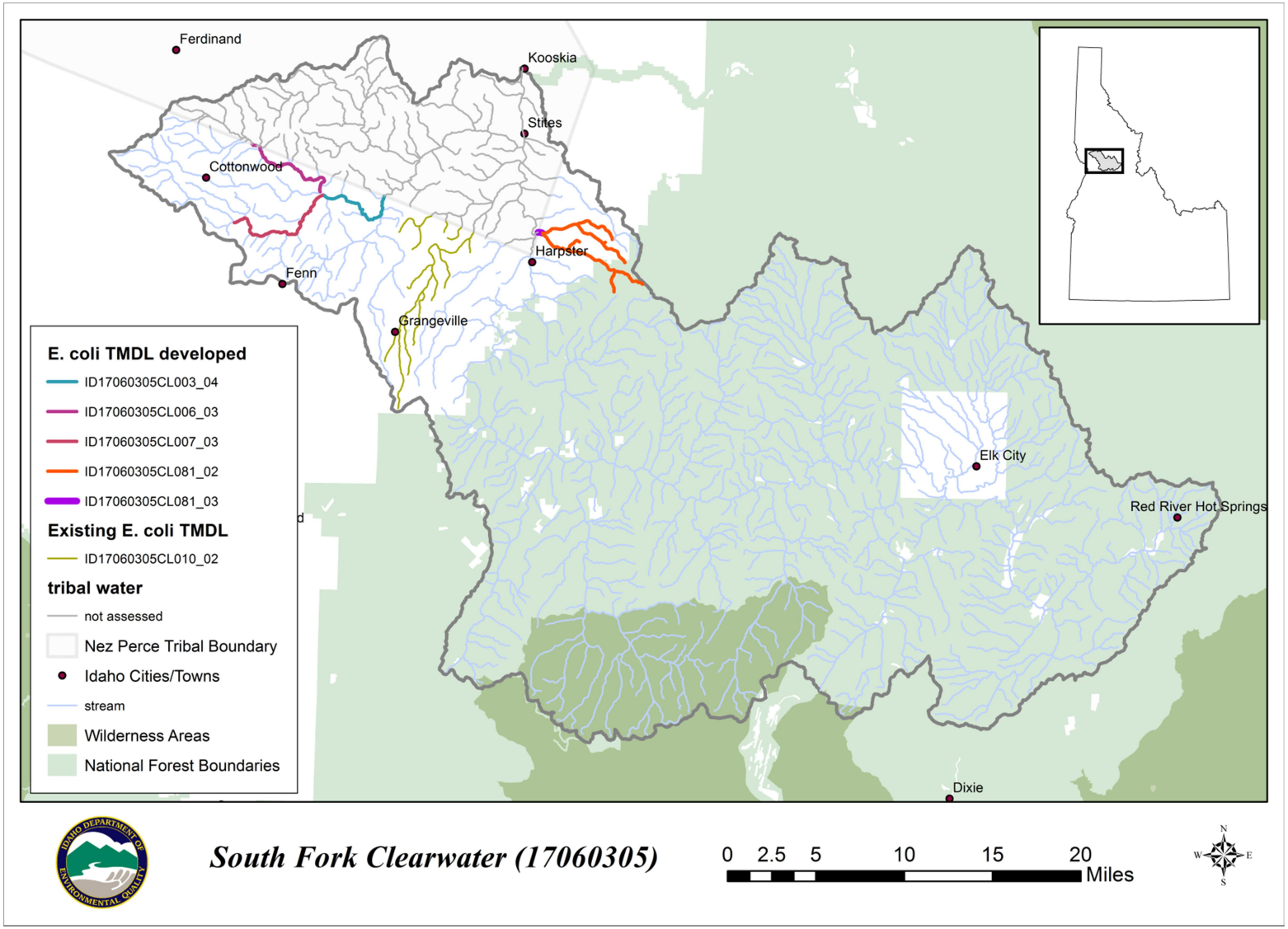

Figure 1. South Fork Clearwater River subbasin and streams evaluated.

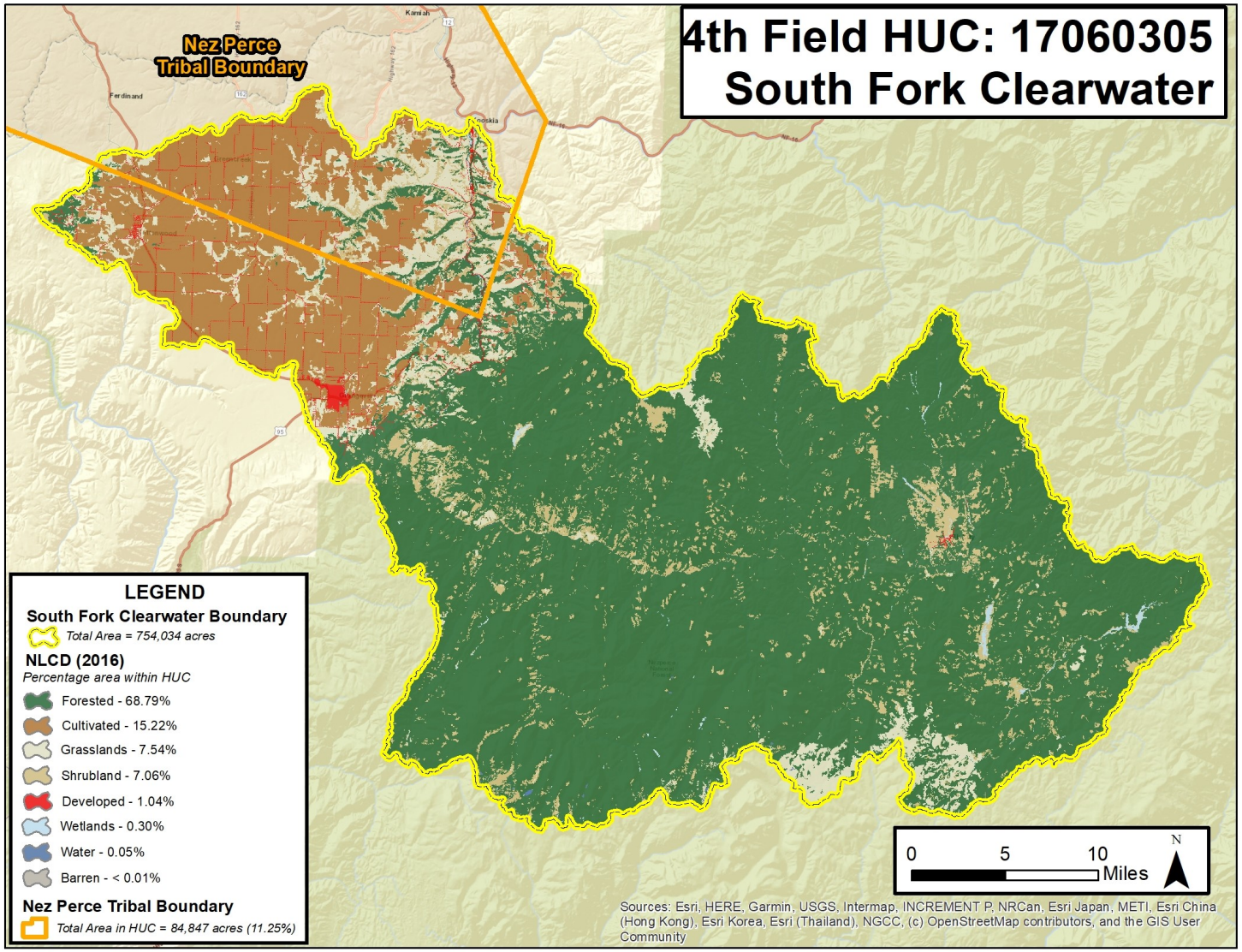

Figure 2. Land uses in the South Fork Clearwater River subbasin.

DEQ previously identified 16 AUs as impaired by fecal coliform bacteria and developed fecal coliform TMDLs in the *Cottonwood Creek Total Maximum Daily Load (TMDL)* (DEQ 2000). Idaho's water quality standards changed in 2000; the fecal coliform criterion was replaced with an *E. coli* criterion (IDAPA 58.01.02.251.01a). In addition, DEQ previously identified Threemile Creek AUs as impaired by *E. coli* and developed *E. coli* TMDLs in the South Fork Clearwater River subbasin TMDLs (DEQ 2004).

1.1 Tribal Waters

Because portions of HUC 17060305 are within the Nez Perce Reservation (Figure 1), TMDLs previously developed in the watershed were created under a memorandum of agreement between DEQ, the Nez Perce Tribe, and EPA (DEQ, NPT, EPA 1998; DEQ, EPA, NPT 2000). DEQ developed a tribal waters policy based on requests from Idaho tribes and EPA. The policy was developed cooperatively with Idaho Indian tribes and EPA, and is described in the 2016 Integrated Report (DEQ 2018).

Starting with Idaho's 2018/2020 Integrated Report (DEQ 2020a), which was submitted to EPA in October 2020, DEQ split Idaho's AUs at EPA-recognized reservation boundaries. AUs wholly within reservation boundaries after the split were labeled as tribal waters in the Integrated Report and placed in their own category (Category 3t) with all beneficial uses unassessed. DEQ will not sample, assess support of beneficial uses, or develop TMDLs for waters within tribal boundaries.

The policy directly addresses TMDLs developed under a memorandum of understanding:

> AUs specified in TMDLs developed under a memorandum of understanding between DEQ, EPA, and the Indian tribes that are wholly within reservation boundaries will no longer be displayed on maps or captured in the Category 4a list (i.e. "Impaired Waters with EPA-Approved TMDLs") (DEQ 2018, p16).

The Cottonwood Creek TMDLs established fecal coliform TMDLs for six AUs wholly with the Nez Perce Reservation and four AUs partially within the reservation. The South Fork Clearwater River TMDL (DEQ 2004) established *E. coli* TMDLs for Threemile Creek, which included one AU wholly within the reservation boundary and one AU partially within the reservation. Table 1 lists AUs in Category 4a of the 2016 Integrated Report (DEQ 2018) that are either partially or wholly within the reservation boundary and were affected by the tribal policy.

The tribal policy was implemented for TMDLs developed in this document. The AUs in Table 1 were split at the tribal boundary. DEQ only monitored *E. coli*, assessed contact recreation use support, and developed new *E. coli* TMDLs for stream segments outside the boundary that DEQ assessed as impaired (Figure 1). Stream segments within the reservation were placed in Category 3t of the 2018/2020 Integrated Report (DEQ 2020a), with all beneficial uses unassessed.

DEQ will not develop new TMDLs for waters within tribal boundaries unless a memorandum of agreement between the three parties governing TMDL development is established. This TMDL does not address waters within the Nez Perce Reservation boundary because both EPA and Nez Perce Tribe Water Resources (NPTWR) requested DEQ implement the tribal policy. NPTWR has repeatedly communicated that the tribe does not want DEQ to assess beneficial use support or develop TMDLs for tribal waters within the South Fork Clearwater River subbasin (Ken Clark, personal communication with DEQ on 8/1/2018 and 12/12/2019). These TMDLs

were developed consistent with the tribal policy described in the 2016 Integrated Report (DEQ 2018).

Table 1. AUs in Category 4a for bacteria in the 2016 Integrated Report (DEQ 2018) affected by implementation of DEQ's tribal waters policy (section 2).

Assessment Unit Name	Within Reservation	Assessment Unit Number (2016 Integrated Report)	Category (2016 Integrated Report)	Assessment Unit Number (2018/2020 Integrated Report)	2018 /2020Integrated Report
Cottonwood Creek—Cottonwood Creek waterfall	Entirely	ID17060305CL002_02	4a (fecal coliform)	ID17060305CL002_02T	3t (unassessed)
Cottonwood Creek—4th order	Entirely	ID17060305CL002_04	4a (fecal coliform)	ID17060305CL002_04T	3t (unassessed)
Cottonwood Creek—source to Cottonwood Creek waterfall	Partially	ID17060305CL003_02	4a (fecal coliform)	ID17060305CL003_02T	3t (unassessed)
				ID17060305CL003_02	Delist fecal coliform, PCR unassessed
Cottonwood Creek—source to Cottonwood Creek waterfall	Partially	ID17060305CL003_04	4a (fecal coliform)	ID17060305CL003_04T	3t (unassessed)
				ID17060305CL003_04	4a (fecal coliform)
Red Rock Creek—Red Rock Creek waterfall to mouth	Entirely	ID17060305CL004_02	4a (fecal coliform)	ID17060305CL004_02T	3t (unassessed)
Red Rock Creek—Red Rock Creek waterfall to mouth	Entirely	ID17060305CL004_03	4a (fecal coliform)	ID17060305CL004_03T	3t (unassessed)
Red Rock Creek—source to Rock Creek waterfall	Entirely	ID17060305CL005_02	4a (fecal coliform)	ID17060305CL005_02T	3t (unassessed)
Red Rock Creek—source to Rock Creek waterfall	Entirely	ID17060305CL005_03	4a (fecal coliform)	ID17060305CL005_03T	3t (unassessed)
Stockney Creek—source to mouth	Partially	ID17060305CL006_02	4a (fecal coliform)	ID17060305CL006_02T	3t (unassessed)
				ID17060305CL006_02	Delist fecal coliform, SCR unassessed
Stockney Creek—source to mouth	Partially	ID17060305CL006_03	4a (fecal coliform)	ID17060305CL006_03T	3t (unassessed)
				ID17060305CL006_03	Category 5; *E. coli* TMDL developed
Threemile Creek—source to unnamed tributary[a]	Partially	ID17060305CL010_02	4a (*E. coli*)	ID17060305CL010_02T	3t (unassessed)
				ID17060305CL010_02	Category 5; *E. coli* TMDL developed
Threemile Creek—unnamed tributary to mouth[a]	Entirely	ID17060305CL010_03	4a (*E. coli*)	ID17060305CL010_03T	3t (unassessed)

a. South Fork Clearwater River TMDLs
Notes: PCR = primary contact recreation use; SCR = secondary contact recreation use

2 Water Quality Concerns and Status

2.1 Water Quality Limited Assessment Units Occurring in the Subbasin

The CWA §303(d) states waters that are unable to support their beneficial uses and do not meet water quality standards must be listed as water quality limited. Subsequently, these waters are required to have TMDLs developed to bring them into compliance with water quality standards.

2.1.1 Listed Waters

Table 2 shows AUs in the subbasin with segments outside of the Nez Perce Reservation boundary listed as impaired by bacteria (fecal coliform or *E. coli*) in the 2016 Integrated Report (DEQ 2018). For each of these AUs, a TMDL was previously developed and approved by EPA (DEQ 2000; DEQ 2004), and fecal coliform or *E. coli* was in Category 4a of the 2016 Integrated Report (DEQ 2018).

Table 2. South Fork Clearwater River subbasin AUs outside the Nez Perce Reservation boundary listed as impaired by bacteria (fecal coliform or *E. coli*) in the 2016 Integrated Report (DEQ 2018).

Assessment Unit Name	Assessment Unit Number	Listed Pollutants	2016 Integrated Report Category
Cottonwood Creek—source to Cottonwood Creek waterfall	ID17060305CL003_02	Fecal coliform	4a (approved TMDL)
Cottonwood Creek—source to Cottonwood Creek waterfall	ID17060305CL003_03	Fecal coliform	4a (approved TMDL)
Cottonwood Creek—source to Cottonwood Creek waterfall	ID17060305CL003_04	Fecal coliform	4a (approved TMDL)
Stockney Creek—source to mouth	ID17060305CL006_02	Fecal coliform	4a (approved TMDL)
Stockney Creek—source to mouth	ID17060305CL006_03	Fecal coliform	4a (approved TMDL)
Shebang Creek—source to mouth	ID17060305CL007_02	Fecal coliform	4a (approved TMDL)
Shebang Creek—source to mouth	ID17060305CL007_03	Fecal coliform	4a (approved TMDL)
South Fork Cottonwood Creek—source to mouth	ID17060305CL008_02	Fecal coliform	4a (approved TMDL)
South Fork Cottonwood Creek—3rd-order segment	ID17060305CL008_03	Fecal coliform	4a (approved TMDL)
Long Haul Creek—source to mouth	ID17060305CL009_02	Fecal coliform	4a (approved TMDL)
Threemile Creek—source to unnamed tributary	ID17060305CL010_02	*E. coli*	4a (approved TMDL)

In 2019, DEQ monitored *E. coli* in all Table 2 AUs, except the third order segment of Cottonwood Creek (AU ID17060305CL003_03), where DEQ could not obtain property access (Table 2). All DEQ monitoring locations were outside the Nez Perce Reservation boundary. Monitoring methods and results are documented in a separate document, *Escherichia coli Patterns in the South Fork Clearwater River Subbasin* (DEQ 2020). DEQ determined four AUs with an existing TMDL are currently impaired by *E. coli*: Cottonwood Creek (ID17060305CL003_04), Stockney Creek (ID17060305CL006_03), Shebang Creek (ID17060305CL007_03), and Threemile Creek (ID17060305CL010_02) (Table 1). In this

document, DEQ develops *E. coli* TMDLs to replace fecal coliform TMDLs for Cottonwood Creek (ID17060305CL003_04), Stockney Creek (ID17060305CL006_03), and Shebang Creek (ID17060305CL007_03). DEQ's *E. coli* assessments and TMDLs apply only to stream segments outside the reservation boundary (Figure 1). DEQ also reviewed the existing TMDL for Threemile Creek (ID17060305CL010_02) (see section 6).

For the other AUs with an existing TMDL in Table 1 (ID17060305CL003_02, ID17060305CL006_02, ID17060305CL007_02, ID17060305CL008_02, and ID17060305CL009_02), DEQ proposed to delist fecal coliform as a cause of impairment in the 2018/2020 Integrated Report (DEQ 2020a) based on recent monitoring (section 2.3). These delistings apply only to segments outside the reservation boundary. The third order segment of Cottonwood Creek (AU ID17060305CL003_03) will remain in Category 4a for fecal coliform because DEQ could not obtain property access to collect *E. coli* data.

The CWA requires EPA to review and approve DEQ's assessment decisions, including proposed delistings, by issuing a decision on Idaho's Integrated Report. Therefore, DEQ did not include detailed delisting justifications in this document. DEQ included text justifying the proposed delistings in the 2018/2020 Integrated Report, which went through public comment and was subsequently submitted to EPA for review and approval in October 2020. EPA approved Idaho's 2018/2020 Integrated Report on October 30, 2020 (EPA 2020), during the October 9-November 9 public comment period for this document (Appendix D). By approving the 2018/2020 Integrated Report, EPA approved delistings for ID17060305CL003_02, ID17060305CL006_02, ID17060305CL007_02, ID17060305CL008_02, and ID17060305CL009_02, meaning these AUs are no longer listed as impaired by Fecal coliform or *E. coli* under the Clean Water Act.

2.2 Applicable Water Quality Standards and Beneficial Uses

Idaho's "Water Quality Standards" (IDAPA 58.01.02) list beneficial uses and set water quality goals for waters of the state. Idaho's water quality standards require that surface waters of the state be protected for beneficial uses, wherever attainable (IDAPA 58.01.02.050.02). These beneficial uses are interpreted as existing uses, designated uses, and presumed uses as described briefly in Appendix A. The *Water Body Assessment Guidance* (DEQ 2016) provides a more detailed description of beneficial use identification for use assessment purposes.

Beneficial uses include the following:

- Aquatic life support—cold water, seasonal cold water, warm water, salmonid spawning, and modified
- Contact recreation—primary (e.g., swimming) or secondary (e.g., boating)
- Water supply—domestic, agricultural, and industrial
- Wildlife habitats
- Aesthetics

2.2.1 Beneficial Uses in the Subbasin

E. coli has the potential to affect support of contact recreation, water supply, wildlife supply, wildlife habitat, and aesthetics beneficial uses. Idaho's water quality standards require that all of

these uses be protected in all waters of the state. *E. coli* TMDLs developed in this document (section 5) were developed specifically to protect contact recreation use because contact recreation is the most sensitive of the potentially affected uses. Idaho's water quality standards include a numeric *E. coli* criterion for protecting contact recreation use (section 2.2.2), and Idaho's *Water Body Assessment Guidance* (DEQ 2016) documents procedures for assessing support of contact recreation uses based on *E. coli* data.

IDAPA 58.01.02 requires that all Idaho waters have water quality that enables recreation. Waters must be protected for primary contact recreation (PCR), activities such as swimming where immersion in water or ingestion of water is likely; or, for secondary contact recreation (SCR), activities such as fishing or boating where immersion in water or ingestion of water is not likely. Table 3 shows recreation use type for each AU addressed in this document. The table is not a comprehensive list of applicable uses in these AUs; it only lists the relevant contact recreation use. The *E. coli* TMDLs developed in this document (section 5) were designed specifically to protect contact recreation uses.

Table 3. Contact recreation uses for AUs evaluated.

Assessment Unit Name	Assessment Unit Number	Contact Recreation Use	Type of Use
Cottonwood Creek—source to Cottonwood Creek waterfall	ID17060305CL003_04	PCR	Designated
Stockney Creek—source to mouth	ID17060305CL006_03	SCR	Presumed
Shebang Creek—source to mouth	ID17060305CL007_03	SCR	Presumed
Threemile Creek—source to unnamed tributary	ID17060305CL010_02	SCR	Designated
Sally Ann Creek—source to and including Wall Creek	ID17060305CL081_02	SCR	Presumed
Sally Ann Creek—Wall Creek to mouth	ID17060305CL081_03	SCR	Presumed

Notes: primary contact recreation (PCR), secondary contact recreation (SCR)

2.2.2 Water Quality Criteria to Support Beneficial Uses

Beneficial uses are protected by a set of water quality criteria, which include *numeric* criteria for pollutants such as bacteria, dissolved oxygen, pH, ammonia, temperature, and turbidity (Appendix B), and *narrative* criteria for pollutants such as sediment and nutrients (IDAPA 58.01.02.250–251).

Numeric criteria for *E. coli* are described in the water quality standards:

> Waters designated for primary or secondary contact recreation are not to contain *E. coli* bacteria in concentrations exceeding a geometric mean of one hundred twenty-six (126) *E. coli* organisms per one hundred (100) mL based on a minimum of five (5) samples taken every three (3) to seven (7) days over a thirty (30) day period (IDAPA 58.01.02.251.01a)

For intermittent waters as defined in IDAPA 58.01.02.010.54, Idaho's water quality standards include minimum flow requirements for application of numeric criteria:

> Numeric water quality standards only apply to intermittent waters during optimum flow periods sufficient to support the uses for which the water body is designated. For recreation, optimum flow is equal to or

> greater than five (5) cubic feet per second (cfs). For aquatic life uses, optimum flow is equal to or greater than one (1) cfs (IDAPA 58.01.02.070.06).

All six AUs addressed in this document are perennial, so *E. coli* criteria apply to these AUs year-round. DEQ's procedure to determine whether a water body fully supports contact recreation is presented in the *Water Body Assessment Guidance* (DEQ 2016) and requires DEQ to use the most complete data available to make beneficial use support status determinations.

2.3 Summary and Analysis of Existing Water Quality Data

Between 2017 and 2019, DEQ collected *E. coli* data at 72 sites across 62 AUs within the South Fork Clearwater River subbasin. Monitoring methods and results are documented in a separate report, *Escherichia coli Patterns in the South Fork Clearwater River Subbasin* (DEQ 2020). DEQ's *E. coli* sampling and assessment approach is summarized in Figure 3.

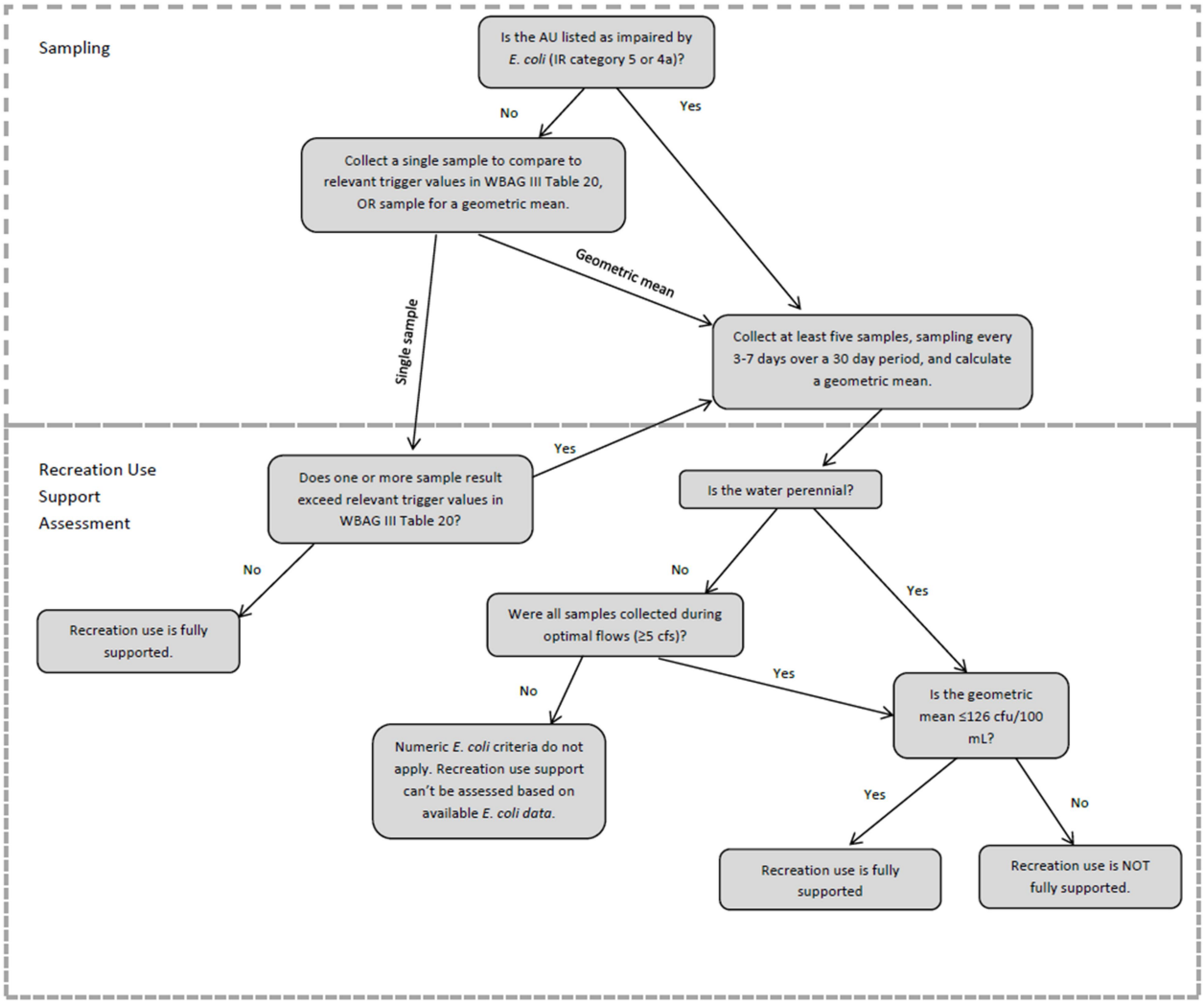

Figure 3. *E. coli* sampling and assessment approach, based on Idaho's *Water Body Assessment Guidance* (DEQ 2016).

DEQ's contact recreation use support decisions for all 62 AUs were documented, made available for public comment, and submitted to EPA for approval through Idaho's 2018/2020 Integrated Report (DEQ 2020a). EPA can only approve or disapprove DEQ's contact recreation use support decisions through the Integrated Report. A summary of DEQ's contact recreation use support decisions based on 2017–2019 monitoring are provided below.

Out of 62 AUs sampled, DEQ assessed 52 as fully supporting contact recreation use based on *E. coli* monitoring results. Five AUs within the Cottonwood Creek watershed (ID17060305CL003_02, ID17060305CL006_02, ID17060305CL007_02, ID17060305CL008_02, and ID17060305CL009_02) were intermittent and did not meet conditions necessary to apply the *E. coli* criterion and evaluate exceedances. For intermittent streams, numeric water quality criteria for protecting recreation uses only apply during *optimal* flows (≥ 5 cubic feet per second [cfs]) (IDAPA 58.01.02.070.06). The *E. coli* criterion requires at least five samples collected every 3 to 7 days over a 30-day period (IDAPA 58.01.02.251.01a). For intermittent streams, flows must be ≥ 5 cfs during the entire geometric mean sampling period (a minimum of 15 days). During 2019 spring high flows, these five AUs did not have ≥ 5 cfs long enough to calculate a geometric mean. These AUs were also documented as dry or having no flow in summer 2019, and for some AUs also in previous years. These five AUs had a fecal coliform TMDL (DEQ 2000), and contact recreation use was identified as impaired (Category 4a in the 2016 Integrated Report [DEQ 2018]) due to fecal coliform impairment. The flow requirements for intermittent streams were added to Idaho's water quality standards after the fecal coliform TMDLs were established. In the 2018/2020 Integrated Report (DEQ 2020a), DEQ proposed to delist fecal coliform and change contact recreation from not supporting (Category 4a) to not assessed for these five AUs outside the reservation boundary. On October 30, 2020, during the public comment period for this document (Appendix D), EPA approved Idaho's 2018/2020 Integrated Report (EPA 2020), and thereby approved the proposed delistings.

DEQ identified six AUs as not supporting contact recreation use because *E. coli* geometric mean results exceeded the *E. coli* criterion. One of these AUs (Threemile Creek, ID17060305CL010_02) already has *E. coli* TMDL (DEQ 2004). Three AUs in the Cottonwood Creek watershed (ID17060305CL003_04, ID17060305CL006_03, and ID17060305CL007_03) had fecal coliform TMDLs (DEQ 2000). Two AUs (Sally Ann Creek, ID17060305CL081_02 and ID17060305CL081_03) were previously unassessed for contact recreation.

For the AUs where TMDLs are developed in this document, available *E. coli* concentrations and stream flow patterns are presented in Figure 4, and recent *E. coli* geometric mean results are presented in Table 4. DEQ compiled all available data, including data collected previously by the Idaho Association of Soil Conservation Districts (IASCD) (IASCD 2007) and Nez Perce Tribe Water Resources (NPTWR 2014), into a database and evaluated *E. coli* data patterns across the watershed. See *Escherichia coli Patterns in the South Fork Clearwater River Subbasin* (DEQ 2020) for details.

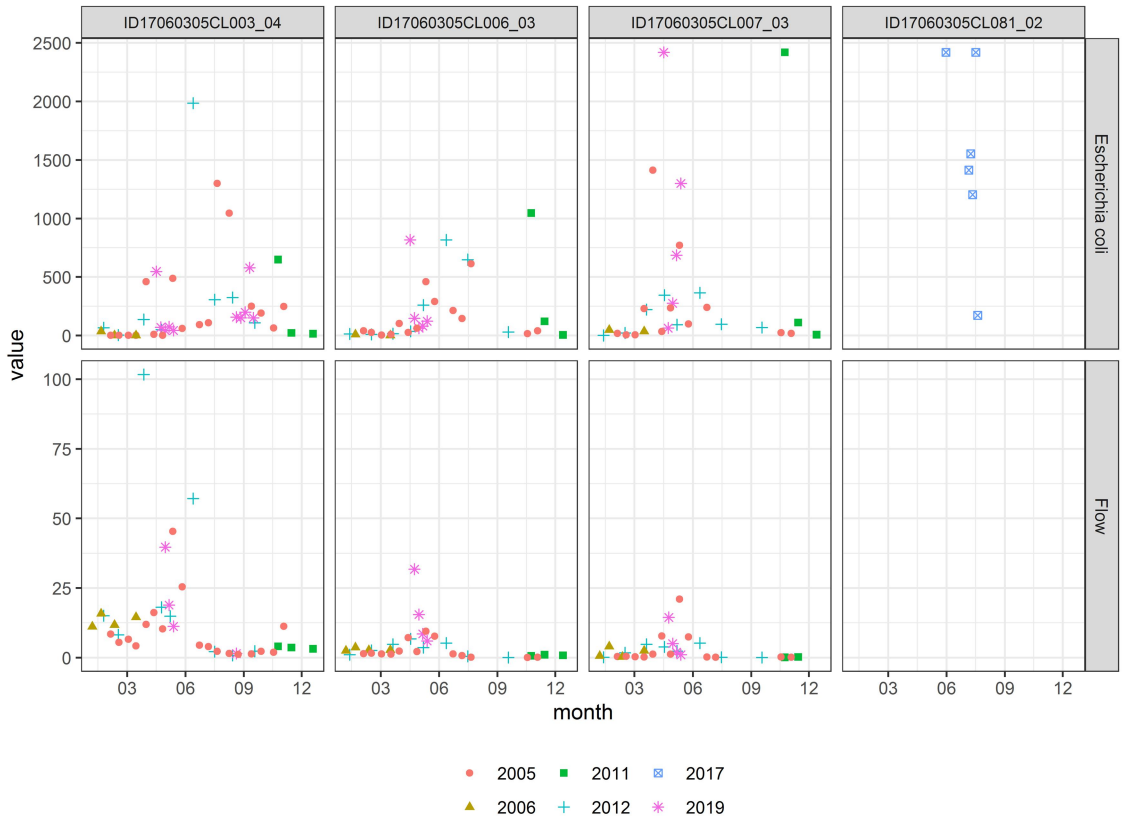

Figure 4. *E. coli* concentration (most probable number [mpn] per 100 milliliters [mL]) and stream flow (cfs) patterns for AUs where an *E. coli* TMDL was developed.

Table 4. *E. coli* geometric mean monitoring results for AUs where an *E. coli* TMDL was developed.

Assessment Unit	Site Description	Sample Dates	Geometric Mean (mpn/100 mL)
ID17060305CL003_04	Cottonwood Creek at tribal boundary	4/16/19 to 5/14/19	88.1
ID17060305CL003_04	Cottonwood Creek at tribal boundary	8/20/19 to 9/16/19	210.9
ID17060305CL006_03	Stockney Creek at Kube Road	4/16/19 to 5/14/19	149.8
ID17060305CL007_03	Shebang Creek at Kube Road	4/16/19 to 5/13/19	519.8
ID17060305CL081_02	Sally Ann Creek 2nd order	7/6/17 to 7/20/17	1019.5
ID17060305CL081_03[a]	Sally Ann Creek mouth[a]	1/22/20 to 2/10/20	222.0

a. Data collected by Nez Perce Tribe Water Resources; the sample site where the geometric mean was quantified is not within AU ID17060305CL081_03; it is within the Nez Perce Reservation boundary, slightly downstream of AU ID17060305CL081_03, which ends at the tribal boundary.

2.3.1 Status of Beneficial Uses

This document addresses six AUs in HUC 17060305 (Table 3). Based on sampling conducted between 2017 and 2020, *E. coli* concentrations exceed Idaho's *E. coli* criterion, and contact recreation use is not supported in these AUs. This assessment applies only to stream segments outside the Nez Perce Reservation boundary.

2.3.2 Assessment Unit Summary

DEQ determined that six AUs outside the Nez Perce Reservation boundary are impaired by *E. coli* based on monitoring documented in the *Escherichia coli Patterns in the South Fork Clearwater River Subbasin* (DEQ 2020). A summary of contact recreation use support status in the 2016 Integrated Report (DEQ 2018) and recent monitoring results for these AUs follows.

2.3.2.1 Assessment Units Addressed in TMDLs

ID17060305CL003_04, Cottonwood Creek—source to Cottonwood Creek waterfall

- A fecal coliform TMDL was previously developed for this AU (Figure 5) in the Cottonwood Creek TMDL (DEQ 2000).
- This AU was in Category 4a (approved TMDL) for fecal coliform in Idaho's 2016 Integrated Report (DEQ 2018).
- Geometric mean *E. coli* concentrations measured at the tribal boundary were 88.1 mpn/100 mL in April–May 2019, and 210.9 mpn/100 mL in August–September 2019. The August–September 2019 geometric mean exceeded the *E. coli* water quality criterion (126 mpn/100 mL).
- In the 2018/2020 Integrated Report (DEQ 2020a), DEQ delisted fecal coliform as a cause of impairment and placed primary contact recreation in Category 5 due to *E. coli* impairment. If EPA approves the *E. coli* TMDLs developed here, DEQ will place primary contact recreation into Category 4a (approved TMDL) in Idaho's next biennial Integrated Report (i.e., 2022 Integrated Report).

Figure 5. Cottonwood Creek at the Nez Perce Reservation boundary, looking downstream.

ID17060305CL006_03, Stockney Creek—source to mouth

- A fecal coliform TMDL was previously developed for this AU (Figure 6) in the Cottonwood Creek TMDL (DEQ 2000).
- This AU was in Category 4a (approved TMDL) for fecal coliform in the 2016 Integrated Report (DEQ 2018).
- The geometric mean *E. coli* concentration measured at the Kube Road crossing in April–May 2019 (149.8 mpn/100 mL) exceeded the *E. coli* water quality criterion (126 mpn/100 mL).
- In the 2018/2020 Integrated Report (DEQ 2020a), DEQ delisted fecal coliform as a cause of impairment and placed secondary contact recreation in Category 5 due to *E. coli* impairment. If EPA approves the *E. coli* TMDLs developed here, DEQ will place secondary contact recreation into Category 4a (approved TMDL) in Idaho's next biennial Integrated Report (i.e., 2022 Integrated Report).

Figure 6. Stockney Creek at the Kube Road crossing, looking upstream.

ID17060305CL007_03, Shebang Creek—source to mouth

- A fecal coliform TMDL was previously developed for this AU (Figure 7) in the Cottonwood Creek TMDL (DEQ 2000).
- This AU was in Category 4a (approved TMDL) for fecal coliform in the 2016 Integrated Report (DEQ 2018).
- A geometric mean *E. coli* concentration measured at the Kube Road crossing in April–May 2019 (519.8 mpn/100 mL) exceeded the *E. coli* water quality criterion (126 mpn/100 mL).
- In the 2018/2020 Integrated Report (DEQ 2020a), DEQ delisted fecal coliform as a cause of impairment and placed secondary contact recreation in Category 5 due to *E. coli* impairment. If EPA approves the *E. coli* TMDLs developed here, DEQ will place secondary contact recreation into Category 4a (approved TMDL) in Idaho's next biennial Integrated Report (i.e., 2022 Integrated Report).

Figure 7. Shebang Creek near the Kube Road crossing.

ID17060305CL010_02, Threemile Creek—source to unnamed tributary

- An *E. coli* TMDL was previously developed for this AU in the South Fork Clearwater River subbasin TMDLs (DEQ 2004).
- This AU was in Category 4a (approved TMDL) for *E. coli* in the 2016 Integrated Report (DEQ 2018).
- In 2019, DEQ calculated geometric mean *E. coli* concentrations at three locations within this AU: near the headwaters (Figure 8), upstream of the City of Grangeville wastewater treatment plant (WWTP) (Figure 9), and downstream of the WWTP (Figure 10). Geometric mean *E. coli* concentrations did not exceed the criterion at the headwaters in spring (2.3 mpn/100 mL) or summer (5.0 mpn/100 mL). Spring geometric mean *E. coli* concentrations exceeded the criterion both upstream (566.4 mpn/100 mL) and downstream (1,146.6 mpn/100 mL) of the WWTP.
- In the 2018/2020 Integrated Report (DEQ 2020a), DEQ kept secondary contact recreation in Category 4a (approved TMDL). A review of the Threemile Creek TMDL required by Idaho Code is included in section 6.

Figure 8. Threemile Creek headwaters.

Figure 9. Threemile Creek upstream of City of Grangeville WWTP.

Figure 10. Threemile Creek downstream of Grangeville WWTP.

ID17060305CL081_02, Sally Ann Creek—source to and including Wall Creek

- Contact recreation use was unassessed for this AU in the 2016 Integrated Report (DEQ 2018).
- A geometric mean *E. coli* concentration measured in July 2017 (1,019.5 mpn/100 mL) in a 2nd-order segment of Sally Ann Creek exceeded the *E. coli* criterion (126 mpn/100 mL).
- In the 2018/2020 Integrated Report (DEQ 2020a), DEQ placed secondary contact recreation in Category 5 due to *E. coli* impairment. If EPA approves the *E. coli* TMDLs developed here, DEQ will place secondary contact recreation into Category 4a (approved TMDL) in Idaho's next biennial Integrated Report (i.e., 2022 Integrated Report).

ID17060305CL081_03, Sally Ann Creek—Wall Creek to mouth

- Contact recreation use was unassessed for this AU in the 2016 Integrated Report (DEQ 2018).
- A geometric mean concentration measured by Nez Perce Tribe Water Resources (NPTWR) in January 2020 (1/22/2020 to 2/10/2020) was 222 mpn/100 mL and exceeded Idaho's *E. coli* criterion. This concentration was measured within the Nez Perce Reservation boundary within ID17060305CL081_03t, approximately 1,200 feet downstream of AU ID17060305CL081_03, which ends at the tribal boundary. DEQ assessed the 3rd-order stream segment of Sally Ann Creek that is outside the tribal boundary (ID17060305CL081_03) as impaired by *E. coli* based on documented *E. coli* criterion exceedances both upstream in ID17060305CL081_02 and downstream within the Nez Perce Reservation. DEQ standard practice is to assess beneficial use support for an AU solely based on data collected within that AU. For example, because DEQ could not gain property access to sample the third order segment of Cottonwood Creek (AU ID17060305CL003_03), DEQ did not make any assessment calls for this AU and kept Fecal coliform in Category 4a for this AU in the 2018/2020 Integrated Report (see Section 2.1 above),

  In this unique case, DEQ based its impairment decision on data collected outside the AU because i) ID17060305CL081_03 is very short (0.25 miles length); ii) geometric mean exceedances were documented a short distance away in both the upstream and downstream AUs; iii) because land use (cattle grazing, forest land) is consistent across ID17060305CL081_03 and upstream and downstream locations where criteria exceedances were documented; iv) the 3rd order segment of Sally Ann Creek was split into two AUs (tribal, non-tribal) in the 2018/2020 Integrated Report only because of the tribal boundary cuts through the AU and Idaho's tribal waters policy, not because of physical or land use differences that would affect water quality; in prior Integrated Reports, the 3rd order segment was all one AU; iv) DEQ would not expect concentrations to be substantially different between the NPTWR sample location within the tribal boundary and approximately 1,200 ft upstream in ID17060305CL081_03; and v) NPTWR collected *E. coli* samples specifically to inform this TMDL effort after coordinating with DEQ, participated in the TMDL WAG process, and had no objection to assessing ID17060305CL081_03 as impaired based on NPTWR data from ID17060305CL081_03t. After collecting geometric mean samples in ID17060305CL081_03t January-February 2020, NPTWR also collected monthly samples

at the same site in the reservation and observed elevated concentrations later in the year as well. Based on preliminary data provided by NPTWR, concentrations were > 1,000 mpn/100 mL in summer 2020.

- In the 2018/2020 Integrated Report (DEQ 2020a), secondary contact recreation was unassessed because *E. coli* data were collected by NPTWR in January-February 2020, after the Integrated Report call for external data period. If EPA approves the *E. coli* TMDLs developed here, DEQ will place secondary contact recreation directly into Category 4a (approved TMDL) in Idaho's next biennial Integrated Report (i.e., 2022 Integrated Report).

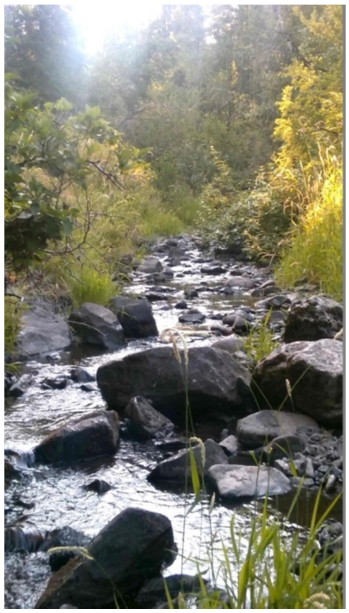

Figure 11. Sally Ann Creek 3rd-order stream segment (AU ID17060305CL081_03).

3 Pollutant Source Inventory

There are both point and nonpoint sources of *E. coli* in the South Fork Clearwater River watershed. The Cottonwood Creek fecal coliform TMDLs identified the City of Cottonwood wastewater treatment plant (WWTP) as a point source, and septic systems and animals dependent on stream water as nonpoint sources within the Cottonwood Creek watershed (DEQ 2000). The South Fork Clearwater River *E. coli* TMDLs for Threemile Creek identified the City of Grangeville WWTP as a point source and multiple potential nonpoint sources including septic systems, livestock feeding operations, and animals dependent on stream water (DEQ 2004). Known point and potential nonpoint sources of *E. coli* within the South Fork Clearwater River watershed are summarized below. To be consistent with Idaho's tribal waters policy, this document only addresses pollutant sources outside the Nez Perce Reservation boundary.

3.1 Point Sources

There are three point sources with an EPA-issued National Pollutant Discharge Elimination System (NPDES) permit to discharge *E. coli* (Table 5). NPDES permits for these point sources

have water-quality based effluent limits for *E. coli* consistent with Idaho's water quality standards.

These three point sources do not fall within the AUs where TMDLs were developed in this document. In addition, no new point sources are anticipated within the AUs where TMDLs were developed. The City of Cottonwood WWTP discharges to Cottonwood Creek (AU ID17060305CL003_02). For this AU, DEQ delisted fecal coliform as a cause of impairment and change secondary contact recreation to not assessed in the 2018/2020 Integrated Report (DEQ 2020a) based on available monitoring data. EPA approved this delisting when it approved Idaho's 2018/2020 Integrated Report (EPA 2020), so the City of Cottonwood WWTP no longer discharges into a stream impaired by bacteria under the CWA. *E. coli* concentrations in the WWTP effluent still need to meet Idaho's *E. coli* criterion because IDAPA 58.01.25.302.06, which implements CWA §301(b)(1)(C), requires permits to include limits for all pollutants or parameters that are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any state or tribal water quality standard. In addition, IDAPA 58.01.02.060.01.d does not allow mixing zones for *E. coli.*

Table 5. Point sources in the South Fork Clearwater River watershed outside the Nez Perce Reservation boundary with a permit to discharge *E. coli.*

Assessment Unit Name	Assessment Unit Number	Point Source	NPDES Permit	Discharge Period	Effluent Limit[a] (mpn/100 mL)
Cottonwood Creek	ID17060305CL003_02	Cottonwood Wastewater Treatment Plant	ID0025887	November–April	126
Threemile Creek	ID17060305CL010_02	Grangeville Wastewater Treatment Plant	ID0020036	Year-round	126
Elk Creek	ID17060305CL056_03	Elk City Wastewater Treatment Plant	ID0022012	Year-round	126

a. Based on the geometric mean of all samples taken during the month.

In July 2018, authority for issuing CWA discharge permits for publicly owned treatment works transferred from EPA to DEQ. Under the Idaho Pollutant Discharge Elimination System (IPDES), DEQ now administers discharge permits for point sources (Table 5) and is responsible for issuing and administering discharge permits for publicly owned treatment works.

For the City of Grangeville WWTP, an EPA-issued NPDES permit became effective on October 1, 2005, and expired on September 30, 2010. EPA administratively extended the permit on September 15, 2010. From January 8 to February 21, 2020, DEQ posted a draft IPDES permit for the City of Grangeville WWTP for public comment. The IPDES permit was subsequently finalized and went into effect in May 2020. The IPDES permit did not change *E. coli* effluent limits from those in the EPA-issued NPDES permit. The permit documented 13 *E. coli* effluent limit exceedances between 2005 and 2018 (DEQ 2018). The WWTP discharges to Threemile Creek (AU ID17060305CL010_02), which is impaired by *E. coli* and has an *E. coli* TMDL (DEQ 2004). In 2019, DEQ documented geometric mean *E. coli* concentrations exceeding the *E. coli* water quality standard (126 mpn/100 mL) both upstream and downstream of the City of Grangeville WWTP (DEQ 2020b). In the 2018/2020 Integrated Report (DEQ 2020a), Threemile Creek (AU ID17060305CL010_02) secondary contact recreation use remains in Category 4a for *E. coli* impairment.

For the City of Cottonwood WWTP, the current EPA-issued NPDES permit was issued October 1, 2002, expired September 30, 2007, and was subsequently administratively extended. DEQ anticipates developing a draft IPDES permit for public comment in late 2020 or early 2021.

There are no permitted stormwater dischargers in the AUs addressed in this document.

3.2 Nonpoint Sources

E. coli is an intestinal bacterium common to warm-blooded animals. Potential sources include wildlife, humans, and livestock. Elevated *E. coli* concentrations can be associated with wildlife waste, poorly-functioning septic systems, livestock manure, and livestock riparian grazing. In the South Fork Clearwater River subbasin, nearly all residences outside incorporated city boundaries have septic systems, and livestock have direct access to streams in many areas. The relative contribution of different nonpoint sources has not been determined for the AUs addressed in this document. Information needed to assess the relative contribution of sources, such as livestock abundance and distribution information, are not currently available. Idaho's *E. coli* criterion was set at a concentration that reduces risk of human illness caused by recreational exposure to water with *E. coli*, regardless of the *E. coli* source.

On March 5, 2020, DEQ collected *E. coli* DNA samples in several of the AUs where TMDLs were developed. Samples were analyzed for the presence of a cow DNA biomarker by Source Molecular laboratories. The analysis tests for a DNA biomarker associated with bacteria present in cow intestines. When the biomarker is detected, this suggests recent stream fecal contamination by cows. The cow DNA biomarker was not detected in any of the samples (Table 6). Concurrent *E. coli* samples also had low *E. coli* concentrations. These results suggest *E. coli* concentrations were low and cow fecal material was not detected on the sample date. Additional *E. coli* biomarker sampling at multiple locations and across multiple seasons would be needed to conclusively identify the potential contribution of cows and other nonpoint sources.

Table 6. March 2020 E. coli DNA biomarker sample results.

Assessment Unit Name	Assessment Unit Number	*E. coli* (mpn/100 mL)	Cow DNA Biomarker
Cottonwood Creek	ID17060305CL003_04	8.6	Not detected
Stockney Creek	ID17060305CL006_03	40.8	Detected below quantification limit
Shebang Creek	ID17060305CL007_03	4.1	Not detected
Sally Ann Creek	ID17060305CL081_03	13.2	Not detected

3.3 Pollutant Transport

Pollutant transport refers to the pathway by which pollutants move from the source to cause a problem or water quality violation in the receiving water body. Wildlife and livestock feces are an *E. coli* source and can be defecated directly into a stream or onto the land surface. *E. coli* in

wastes on the land surface may enter streams through runoff and overland transport, or through infiltration into ground water and subsequent subsurface transport to a stream. Before entering a stream, *E. coli* concentrations in surface wastes may change through growth or die-off, depending on environmental conditions (Cho et al. 2016). When discharged from a point source such as a WWTP, *E. coli* is typically discharged directly into a stream.

Once in a stream, multiple physical processes affect *E. coli* concentrations, including dilution, dispersion, settling, and resuspension due to stream flows or hyporheic exchange (Cho et al. 2016). Biological processes, such as predation and die-off rates (controlled by temperature, solar radiation, dissolved oxygen, pH, and other environmental factors), also affect instream *E. coli* concentrations (Cho et al. 2016). Because *E. coli* experience optimal growth rates in environmental conditions present in animal intestines, they typically die off rapidly after they exit animal intestines, and elevated *E. coli* concentrations in surface water suggest relatively recent surface water fecal contamination.

4 Summary of Past and Present Pollution Control Efforts and Monitoring

4.1 Pollution Control Efforts

Many water quality improvement projects have been completed within HUC 17060305 since the Cottonwood Creek TMDL was finalized in 2000. DEQ contacted the US Forest Service, Nez Perce Tribe, Bureau of Land Management, US Environmental Protection Agency, Idaho Department of Lands, Idaho Department of Fish and Game, Natural Resources Conservation Service, Idaho Soil and Water Conservation Commission, and Idaho County Roads Department to request information related to water quality improvement projects completed in HUC 17060305 since 2000. DEQ used agency responses to develop an inventory of completed and ongoing water quality improvement projects. Since 2000, at least $25 million dollars have been spent across over 60 projects. Many projects were located within the Nez Perce-Clearwater National Forest and focused on salmonid habitat restoration. A subset of 20 projects totaling over $4 million dollars included actions specifically designed to reduce bacteria or addressed streams with a bacteria TMDL.

Table 7 lists projects that addressed Camas Prairie streams with a bacteria TMDL, and projects outside the Camas Prairie where agencies indicated addressing livestock impacts or reducing bacteria loading was a project goal. Figure 12 shows the general location of projects completed by the Idaho County Soil & Water Conservation District. Figure 13 shows the general location of conservation district projects focused on livestock. The markers in Table 7, Figure 12, and Figure 13 may represent multiple best management practices (BMPs) or multiple locations. Project location maps were provided by that Idaho Soil and Water Conservation Commission.

Table 7. Pollution control projects completed in the South Fork Clearwater River subbasin that either focused on bacteria or addressed a stream with a bacteria TMDL.

Project Area	Project Name	Funding Source	Sponsor	Dates	Funding[a] ($)	Focus BMPs	Figure 12 Legend
Cottonwood Cr	South Fork Cottonwood Creek BMP Implementations	Federal (§319)	Idaho SWCD	2001–2003	286,159	Residue management, nutrient management, livestock facilities	
Cottonwood Cr	Cottonwood BMP Implementations	State (WQPA)	Idaho SWCD	2001–2004	208,604	Residue management, nutrient management, livestock facilities	
Cottonwood Cr	Cottonwood Creek Restoration	Federal (SRBA)	Idaho SWCD	2011–2014	311,396	Residue management, nutrient management, livestock facilities	
Red Rock Cr	Red Rock Creek Livestock BMP Implementations—Phase 2	Federal (§319)	Idaho SWCD	2019–2022	177,684	Livestock facilities	
Red Rock Cr	Red Rock Creek AFO Implementation Project	State Ag Fund	Idaho SWCD	2017–2018	128,237	Livestock facilities	
Camas Prairie	Western Camas Prairie Culvert Replacement	Federal (§319)	Idaho SWCD	2016–2018	184,925	Sediment management	
Threemile Creek	Addressing Temperature Issues in Three Mile Creek	Federal (§319)	PCEI	2016–2018	90,064	Riparian vegetation	
Camas Prairie	South For Clearwater Watershed Vegetation	Federal (§319)	PCEI	2010–2014	246,261	Riparian vegetation, channel stabilization, drainage water management, wetland s	
Camas Prairie	North Idaho Division II Animal Feeding Project	Federal (§319) an state (WQPA)	Latah SWCD	2002–2012	—	Region-wide livestock project; subset of funds used locally	
Camas Prairie	South Fork Clearwater River BMP Implementations (WQPA)	State (WQPA)	Idaho SWCD	2007–2012	500,014	Residue management, nutrient management, livestock facilities	
Camas Prairie	South Fork Clearwater River BMP Implementations (§319)	Federal (§319)	Idaho SWCD	2010–2013	250,000	Residue management, nutrient management, livestock facilities	
Cottonwood Cr	Cottonwood Phase 2 BMP Implementations (§319)	Federal (§319)	Idaho SWCD	2003–2007	247,974	Residue management, nutrient management, livestock facilities	
Cottonwood Cr	Cottonwood Phase 2 BMP Implementations (WQPA)	State (WQPA)	Idaho SWCD	2003–2011	200,000	Residue management, nutrient management, livestock facilities	
Threemile Cr	Threemile/Butcher BMP Implementations	Federal (§319)	Idaho SWCD	2005–2009	248,736	Livestock facilities, pastures	
Threemile Cr and main stem SF Clearwater River	SF Clearwater Watershed Riparian Project	Federal (§319)	PCEI	2006–2011	181,435	Bank stabilization, livestock, riparian	
Meadow Creek Watershed	McComas Meadows Fence Replacement	Federal (BPA)	NPT	2017-2020	250,000	Improved fish and riparian habitat, cattle exclosure	
American River	Elk Creek Riparian Fence	Federal (BLM)	BLM	2010	20,000	Riparian exclosure fence	

American River & Red River	American River and Red River Phase 2	Federal (§319)	FOC Inc.	2010–2014	250,000	Livestock, stream bank stabilization
American River and Red River	American River and Red River	Federal (§319)	FOC Inc.	2008–2012	247,943	Livestock, riparian restoration, roads
American River	American River Water Quality Improvement	Federal (§319)	FOC Inc.	2007–2012	238,242	Livestock, riparian restoration, roads
	TOTAL				4,267,674	

a. Awarded grant dollars only, does not include matching funds.
Notes: Idaho County Soil and Water Conservation District (ISWCD), Palouse Clearwater Environmental Institute (PCEI), Water Quality Program for Agriculture (WQPA), Framing Our Community, Inc. (FOC Inc), Bureau of Land Mangement (BLM), Nez Perce Tribe (NPT), Bonneville Power Administration (BPA).

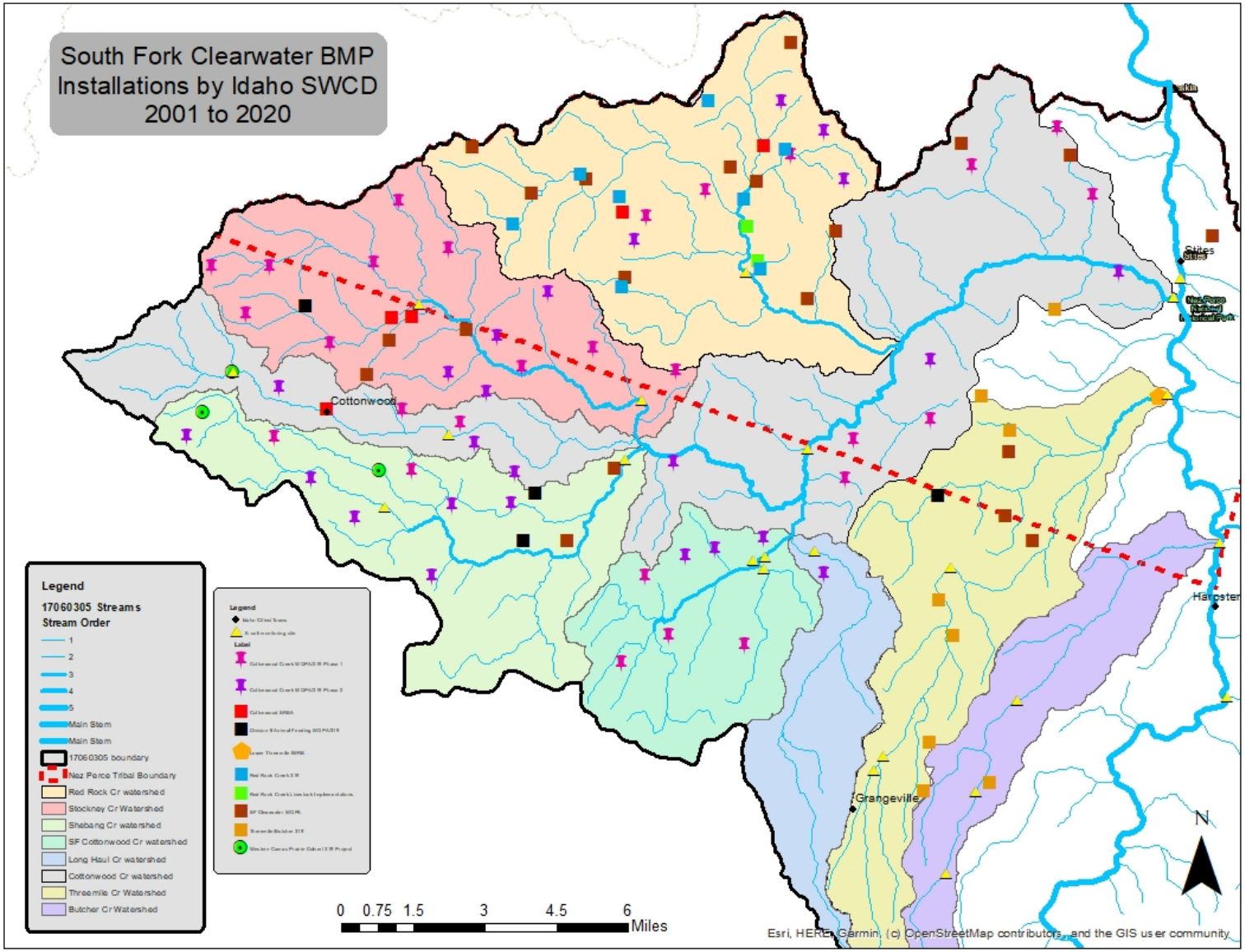

Figure 12. Location of pollution control projects completed by Idaho SWCD (Table 7). Yellow triangles are locations where *E. coli* data have been collected.

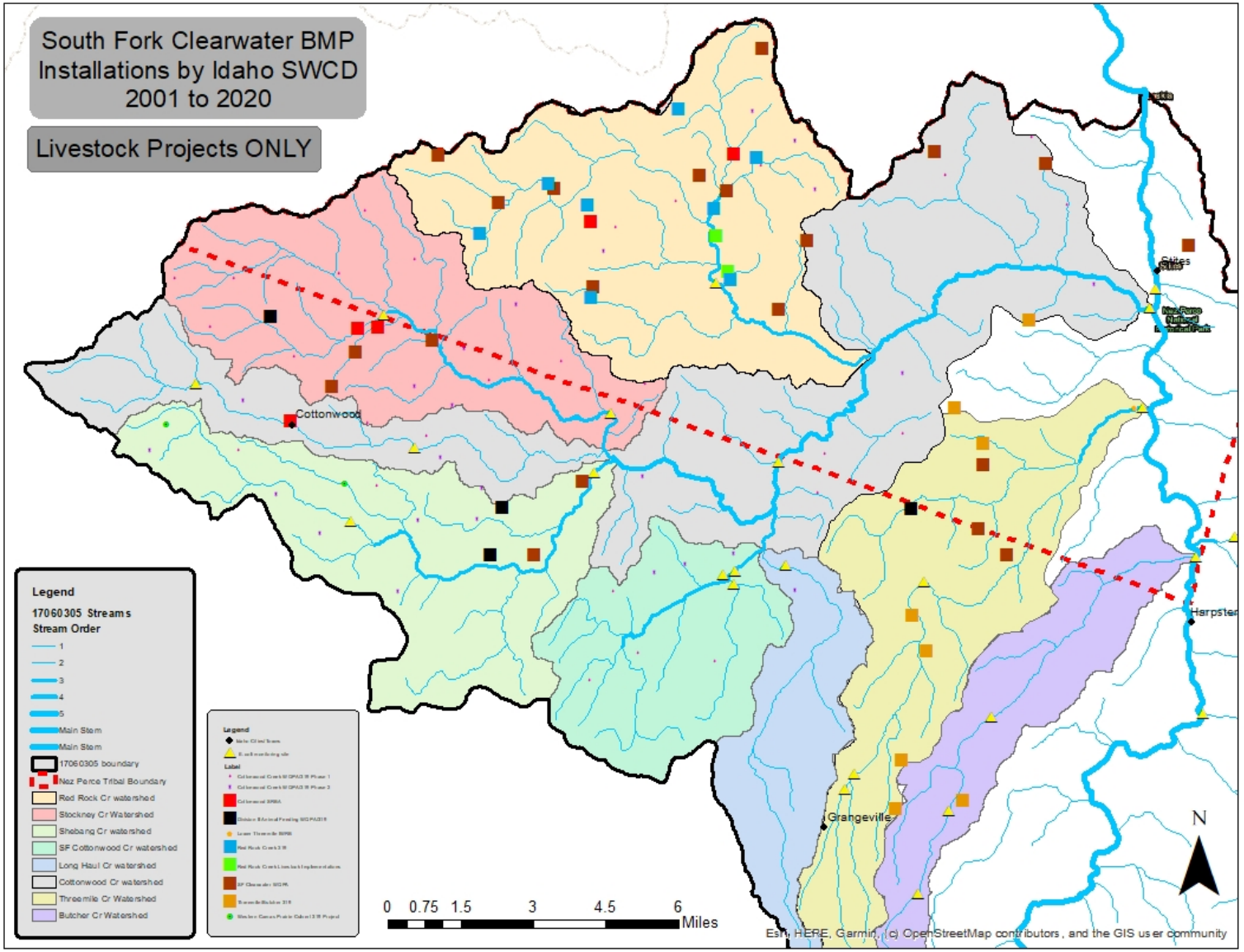

Figure 13. Location of pollution control projects focused on livestock completed by Idaho SWCD (Table 7). Yellow triangles show the locations where *E. coli* data have been collected.

Past pollution control efforts in the watershed relevant to *E. coli* can be grouped into four general categories: reducing livestock access to streams and riparian areas, infrastructure for livestock heavy use areas, livestock waste management, and surface runoff controls.

Livestock Access to Streams and Riparian Areas

In several projects, controls were installed to limit livestock stream access and reduce *E. coli* inputs to streams (Table 7). Across the subbasin, over 100,000 linear feet (~19 miles) of livestock exclusion fencing were installed through these projects. Many of these projects also installed off-stream watering structures such as developed springs or watering facilities to replace direct stream access as a livestock water source (Figure 14). Other actions included installing culverts at cattle crossings to keep cattle out of the creek, and managing livestock trails and walkways.

Figure 14. Off-stream livestock watering trough installed through project S114 (Table 7).

Livestock Heavy Use Areas

Several projects installed concrete structures in areas heavily used for livestock feeding or waste management (Figure 15). Installing impervious surfaces reduces soil erosion and compaction by livestock, makes waste cleanup easier, and reduces pollutant ground water infiltration.

Figure 15. Concrete cattle-feeding facility installed in the Red Rock Creek watershed (project S569).

Livestock Waste Management

In several projects livestock waste management infrastructure, such as waste storage facilities, was installed (Table 7). In addition, producers developed nutrient management plans to improve livestock waste management.

Surface Runoff Controls

Projects designed to reduce pollutant transport to streams through surface runoff may reduce *E. coli* inputs to streams. Some efforts were designed to address sediment or nutrients runoff, which may also reduce *E. coli* runoff at some locations. Activities included installing riparian buffer strips, roof runoff control structures, and implementing practices to reduce runoff from cropland such as direct seeding and no till agriculture.

4.2 Impacts of Pollution Control Efforts

Escherichia coli Patterns in the South Fork Clearwater River Subbasin (DEQ 2020) documents *E. coli* monitoring methods and results throughout the subbasin. Several watersheds where agricultural BMPs have been installed have seen water quality improvements. For example, several livestock-focused pollution control projects have been implemented in the Stockney Creek and South Fork Cottonwood Creek watersheds (Figure 12). In the upper portion of Stockney Creek (AU ID17060305CL006_02), geometric mean *E. coli* concentrations were less than the *E. coli* criterion in spring 2019. The lower portion of Stockney Creek (AU ID17060305CL006_03) remains impaired by *E. coli.* In the South Fork Cottonwood Creek watershed (AU ID17060305CL008_03), geometric mean *E. coli* concentrations were also less than the *E. coli* criterion in 2019, and DEQ will propose to change secondary contact recreation use from not supporting to fully supporting in Idaho's upcoming 2018/2020 Integrated Report.

Four AUs with existing bacteria TMDLs still had bacteria impairments in 2019, despite pollution control efforts. These AUs included Cottonwood Creek (ID17060305CL003_04), lower Stockney Creek (ID17060305CL006_03), Shebang Creek (ID17060305CL007_03), and Threemile Creek (ID17060305CL010_02). *E. coli* TMDLs are developed for all four of these AUs (section 5). Pollution control efforts in these creeks were not sufficient to reduce *E. coli* concentrations, at least at monitored stream sites.

To help guide pollution control efforts, DEQ recommends that DEQ, Nez Perce Tribe Water Resources, Idaho County Soil and Water Conservation District, and Idaho Soil and Water Conservation Commission develop an interagency water quality monitoring plan. Because monitoring data will be used by the Idaho County Soil and Water Conservation District and the conservation commission to identify where BMPs are needed, inform the design of conservation projects, and promote voluntary action by landowners, the monitoring plan should be designed with input from these users and with their needs in mind. Feedback between monitoring and implementation efforts is critical for achieving water quality goals. In most cases, DEQ has not collected water quality samples to monitor the impacts of specific projects, partly due to limited monitoring resources and partly due to limited project information. In some cases, landowners or the conservation district have been reluctant to provide specific spatial documentation (latitude and longitude, shapefiles, and maps) of exactly where BMPs have been installed because of privacy concerns. This lack of information makes it challenging to collect water quality data to

document local water quality improvements from a project, or to identify specific locations where additional projects are needed or areas where projects would yield the greatest impact.

5 Total Maximum Daily Loads

A TMDL prescribes an upper limit (i.e., load capacity) on discharge of a pollutant from all sources to ensure water quality standards are met. It further allocates this load capacity among the various sources of the pollutant. Pollutant sources fall into two broad classes: point sources, each of which receives a wasteload allocation, and nonpoint sources, each of which receives a load allocation. Natural background contributions, when present, are considered part of the load allocation but are often treated separately because they represent a part of the load not subject to control. Because of uncertainties about quantifying loads and the relation of specific loads to attaining water quality standards, the rules regarding TMDLs (40 CFR 130) require a margin of safety be included in the TMDL. Practically, the margin of safety and natural background are both reductions in the load capacity available for allocation to pollutant sources.

Load capacity can be summarized by the following equation:

$$LC = MOS + NB + LA + WLA = TMDL$$

Where:

LC = load capacity

MOS = margin of safety

NB = natural background

LA = load allocation

WLA = wasteload allocation

The equation is written in this order because it represents the logical order in which a load analysis is conducted. First, the load capacity is determined. Then the load capacity is broken down into its components. After the necessary MOS and natural background, if relevant, are quantified, the remainder is allocated among pollutant sources (i.e., the load allocation and wasteload allocation). When the breakdown and allocation are complete, the result is a TMDL, which must equal the load capacity.

The load capacity must be based on critical conditions—the conditions when water quality standards are most likely to be violated. If protective under critical conditions, a TMDL will be more than protective under other conditions. Because both load capacity and pollutant source loads vary, and not necessarily in concert, determining critical conditions can be more complicated than it may initially appear.

Another step in a load analysis is quantifying current pollutant loads by source. This step allows for the specification of load reductions as percentages from current conditions, considers equities in load reduction responsibility. A load is fundamentally a quantity of pollutant discharged over some period of time and is the product of concentration and flow. Due to the diverse nature of various pollutants, and the difficulty of strictly dealing with loads, the federal rules allow for "other appropriate measures" to be used when necessary (40 CFR 130.2). These other measures must still be quantifiable and relate to water quality standards, but they allow flexibility to deal

with pollutant load in more practical and tangible ways. The rules also recognize the particular difficulty of quantifying nonpoint loads and allow "gross allotment" as a load allocation where available data or appropriate predictive techniques limit more accurate estimates. For certain pollutants whose effects are long term, such as sediment and nutrients, EPA allows for seasonal or annual loads.

5.1 Instream Water Quality Targets

Water quality targets were selected to restore "full support of designated beneficial uses" (Idaho Code §39-3611, §39-3615), specifically contact recreation use.

5.1.1 Design Conditions

Design conditions are the conditions that the TMDL was designed to protect. The *E. coli* TMDLs were designed to protect primary and secondary contact recreation uses year-round because the Idaho's water quality standard for *E.coli* applies year-round in perennial streams. The TMDL was designed to be protective of contact recreation use regardless of variation in flow, temperature, etc.

Critical conditions—the conditions when water quality standards are most likely to be violated—include warm summer months and periods when animals are concentrated near streams. In warm summer months, low flows decrease dilution and high water temperatures reduce *E. coli* die-off rates. In addition, during seasons when livestock and wildlife are concentrated near streams, there is an increased probability of *E. coli* inputs to streams and *E. coli* criterion exceedances. The time period when livestock and wildlife are concentrated near streams may vary for each AU, depending on the type of livestock present, how livestock are managed, and wildlife distribution. Because the TMDL was designed to protect contact recreation uses year-round, regardless of physical conditions or timing of animal presence, it is also protective during critical conditions.

5.1.2 Target Selection

The Idaho's water quality standard for *E. coli* was selected as the instream water quality target. The target is a geometric mean *E. coli* concentration of 126 organisms per 100 milliliters (mL), calculated based on at least five samples spaced 3 to 7 days apart over a 30-day period (IDAPA 58.01.02.251.01a). The target is the same for all AUs, and applies year-round.

5.1.3 Water Quality Monitoring Points

When possible, DEQ monitored sites previously monitored by NPTWR and IASCD. All DEQ *E. coli* monitoring sites in HUC 17060305 are documented in the *Escherichia coli Patterns in the South Fork Clearwater River Subbasin* (DEQ 2020). Monitoring location information for HUC 17060305 sites (latitude, longitude, and descriptions) is also publicly available through the Water Quality Portal (*www.waterqualitydata.us*) and the SF-CLEAR database (Appendix C). Monitoring sites for the four AUs where a TMDL was developed are described in Table 8

Table 8. Monitoring sites for AUs where an *E. coli* TMDL was developed.

DEQ WQX Site ID	Alternate Site IDs[a]	Assessment Unit Name	Assessment Unit Number	Latitude	Longitude
IDEQ_WQX-2019LEWSC3_04	NEZPERCETRIBE_WQX-01412A, TCC-8	Cottonwood Creek at tribal boundary	ID17060305CL003_04	46.03581	-116.13988
IDEQ_WQX-2019LEWSC6_03	NEZPERCETRIBE_WQX-07801A, TCC-3	Stockney Creek at Kube Road	ID17060305CL006_03	46.05081	-116.21203
IDEQ_WQX-2019LEWSC7_03	NEZPERCETRIBE_WQX-07101A, TCC-4	Shebang Creek at Kube Road	ID17060305CL007_03	46.03408	-116.21873
IDEQ-WQX-2017LEWSC81_02	—	Sally Ann Creek 2nd order	ID17060305CL081_02	46.01205	-115.94437
—	b	Sally Ann Creek mouth	ID17060305CL081_03	46.009758	-115.96259

a. Site IDs used by NPTWR or IASCD.
b. Site monitored by Nez Perce Tribe in 2020, and data are not yet in WQX, so a site ID is not yet available.

5.2 Load Capacity

A load capacity is the maximum pollutant load a water body can accommodate while still meeting water quality standards. For each AU, the *E. coli* load capacity is calculated as:

$$Load\ capcity\ (LC)\left(\frac{mpn}{day}\right) = flow\ \left(\frac{ft^3}{second}\right) * target\ \left(\frac{mpn}{100\ mL}\right) * 28{,}316.8\ \left(\frac{mL}{ft^3}\right) * 86{,}400\ \left(\frac{second}{day}\right),$$

where the target concentration is the *E. coli* criterion (126 mpn/100 mL geometric mean) (IDAPA 58.01.02.251.01), and flow is the ambient stream flow.

This load capacity is flow-dependent. Flow varies throughout the year, so load capacity values also vary with flow throughout the year. The load capacity requires the target to be achieved at all times (i.e. year-round during all flow conditions), and therefore is protective during all conditions, including critical conditions.

Table 9 shows load capacities calculated using the above equation for a range of potential flows selected based on the range of flows measured within AUs where TMDLs were developed (Figure 4). The load capacities in Table 9 represent a realistic range of load capacity values for all five AUs addressed in this TMDL. To calculate the load capacity for a specific flow condition, the flow value of interest must be substituted into the above equation.

Table 9. *E. coli* TMDL allocations based on flow for AUs 03_04, 06_03, 07_03, 81_02, and 81_03.

Flow (ft^3/s)	Target Concentration (mpn/100 mL)	Load Capacity[a] (mpn/day)	Margin of Safety (mpn/day)	Load Allocation[b] (mpn/day)	Waste Load Allocation (mpn/day)	Natural Background (mpn/day) [c]
0.1	126	3.08×10^8	3.08×10^7	2.77×10^8	0	-
1.0	126	3.08×10^9	3.08×10^8	2.77×10^9	0	-
10.0	126	3.08×10^{10}	3.08×10^9	2.77×10^{10}	0	-
100	126	3.08×10^{11}	3.08×10^{10}	2.77×10^{11}	0	-

a. Flow x target; b. Load capacity – (load capacity * MOS); c: natural background is included in the load allocation; *Notes*: cubic feet per second (ft^3/s)

5.3 Estimates of Existing Pollutant Loads

Regulations allow that loads "...may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading" (40 CFR 130.2(g)). Existing *E. coli* loads are calculated as:

$$Existing\ load\left(\frac{mpn}{day}\right) = flow\left(\frac{ft^3}{second}\right) * geometric\ mean\left(\frac{mpn}{100\ mL}\right) * 28{,}316.8\left(\frac{mL}{ft^3}\right) * 86{,}400\left(\frac{second}{day}\right)$$

An *E. coli* TMDL is needed where a geometric mean *E. coli* concentration exceeds the *E. coli* criterion of 126 mpn/100 mL. If the geometric mean exceeds the criterion, the existing load also exceeds the load capacity (section 5.2, Table 9). The geometric mean from each AU exceeded the *E. coli* criterion (Table 4 and Table 10), so the load capacity is also exceeded.

Table 10. Current geometric mean concentrations and percent reduction in current concentration needed to achieve the TMDL target (126 mpn/100 mL).

Assessment Unit Name	Assessment Unit Number	Sample Dates	Geometric Mean (mpn/100 mL)	Percent Reduction Needed (%)
Cottonwood Creek at tribal boundary	ID17060305CL003_04	8/20/19 to 9/16/19	210.9	40
Stockney Creek at Kube Road	ID17060305CL006_03	4/16/19 to 5/14/19	149.8	16
Shebang at Kube Road	ID17060305CL007_03	4/16/19 to 5/13/19	519.8	76
Sally Ann Creek 2nd order	ID17060305CL081_02	7/6/17 to 7/20/17	1019.5	87
Sally Ann Creek at mouth	ID17060305CL081_03[a]	1/22/20 to 2/10/20	222.0	43

a. Sample site where the geometric mean was quantified is not within AU ID17060305CL081_03; the site is within the Nez Perce Reservation boundary, approximately 300 feet downstream of AU ID17060305CL081_03, which ends at the tribal boundary.

5.4 Load and Wasteload Allocation

A wasteload allocation is the pollutant load allocated to point sources. A load allocation is the pollutant load allocated to nonpoint sources. For the AUs addressed in this TMDL, there are no known *E. coli* point sources. All allowable pollutant loads are allocated to nonpoint sources through an *E. coli* load allocation (Table 9). In this TMDL, the load allocation was set based on Idaho's *E. coli* criterion with the margin of safety subtracted (LA = LC – MOS).

5.4.1 Margin of Safety

A MOS accounts for uncertainties that may affect the protectiveness of a TMDL. It reduces the pollutant load available for allocation to nonpoint and point sources. A MOS can be implicit or explicit.

DEQ selected a 10% explicit MOS based on uncertainty associated with *E. coli* field duplicate measurements. Field duplicates are two samples collected at the same site and time following the same sampling and analytical procedures. Based on data available in DEQ's *E. coli* database at the time this TMDL was developed, the arithmetic mean absolute difference in concentration between field duplicate samples (|original – duplicate|) for cases where the original sample result was less than the *E. coli* criterion (126 mpn/100 mL) was 10.7 mpn/100 mL (based on 39 duplicate pairs collected across Idaho from 2016 to 2019). This value represents the average *E. coli* measurement uncertainty for individual sample results below the criterion and corresponds to 8.5% of 126 mpn/100 mL. A 10% MOS was selected to be conservative (protective) considering the limited data available for this analysis.

5.4.2 Seasonal Variation

Loads developed in this TMDL apply year-round because the streams addressed are perennial, and Idaho's *E. coli* criterion applies year-round in perennial streams. *E. coli* concentrations are often highest during the summer when water is warm, and when warm-blooded animals are near the stream.

5.4.3 Reasonable Assurance

The CWA §319 requires each state to develop and submit a nonpoint source management plan. The EPA-approved *Idaho Nonpoint Source Management Plan* (DEQ 2015) identifies programs to achieve implementing nonpoint source BMPs and includes a schedule for program milestones, outlines key agencies and agency roles, is certified by the state attorney general to ensure that adequate authorities exist to implement the plan, and identifies available funding sources.

Idaho's nonpoint source management program describes many of the voluntary and regulatory approaches the state will take to abate nonpoint pollution sources. One of the prominent programs described in the plan is the provision for public involvement, including basin advisory groups and WAGs. The South Fork Clearwater WAG is designated for the South Fork Clearwater River subbasin.

Idaho's water quality standards refer to existing authorities to control nonpoint pollution sources in Idaho. Some of these authorities and responsible agencies are listed in Table 11.

Table 11. State of Idaho's regulatory authority for nonpoint pollution sources.

Authority	Water Quality Standard	Responsible Agency
Rules Pertaining to the Idaho Forest Practices Act (IDAPA 20.02.01)	58.01.02.350.03(a)	Idaho Department of Lands
Solid Waste Management Rules and Standards (IDAPA 58.01.06)	58.01.02.350.03(b)	Idaho Department of Environmental Quality
Individual/Subsurface Sewage Disposal Rules (IDAPA 58.01.03)	58.01.02.350.03(c)	Idaho Department of Environmental Quality
Stream channel Alteration Rules (IDAPA 37.03.07)	58.01.02.350.03(d)	Idaho Department of Water Resources
Rathdrum Prairie Sewage Disposal Regulations (Panhandle District Health Department)	58.01.02.350.03(e)	Idaho Department of Environmental Quality/Panhandle District Health Department
Rules Governing Exploration, Surface Mining and Closure of Cyanidation Facilities (IDAPA 20.03.02)	58.01.02.350.03(f)	Idaho Department of Lands
Dredge and Placer Mining Operations in Idaho (IDAPA 20.03.01)	58.01.02.350.03(g)	Idaho Department of Lands
Rules Governing Dairy Waste (IDAPA 02.04.14)	58.01.02.350.03(h)	Idaho State Department of Agriculture

Idaho uses a voluntary approach to address agricultural nonpoint sources; regulatory authority is found in IDAPA 58.01.02.350.01–03. The Idaho Agricultural Pollution Abatement Plan (Ag Plan) (ISWCC 2015) provides direction to the agricultural community on approved BMPs (IDAPA 58.01.02.055.07). A portion of the Ag Plan outlines responsible agencies or elected groups (soil conservation districts) that will take the lead if nonpoint source pollution problems need to be addressed. For agricultural activity, the Ag Plan assigns the local soil conservation districts to assist the landowner/operator with developing and implementing BMPs to abate nonpoint source pollution associated with the land use. If a voluntary approach does not succeed in abating the pollutant problem, the state may seek injunctive relief for those situations determined to be an imminent and substantial danger to public health or the environment (IDAPA 58.01.02.350.02(a)).

Idaho's water quality standards and wastewater treatment requirements specify that if water quality monitoring indicates that water quality standards are not being met, even with the use of BMPs or knowledgeable and reasonable practices, the state may request that the designated agency evaluate and/or modify the BMPs to protect beneficial uses. If necessary, the state may seek injunctive or other judicial relief against the operator of a nonpoint source activity according to the DEQ director's authority provided in Idaho Code §39-108 (IDAPA 58.01.02.350). The water quality standards list designated agencies responsible for reviewing and revising nonpoint source BMPs: Idaho Department of Lands for timber harvest activities, oil and gas exploration and development, and mining activities; ISWCC for grazing and agricultural activities; Idaho Transportation Department for public road construction; Idaho State Department of Agriculture for aquaculture; and DEQ for all other activities (IDAPA 58.01.02.010.24).

5.4.4 Natural Background

Natural background *E. coli* loads have not been quantified for streams addressed in these TMDLs, so natural background loads are not included in Table 9. The load allocation in Table 9 includes the unquantified natural background load.

5.4.5 Reserve for Growth

A growth reserve has not been included in this TMDL. The load capacity has been allocated to the existing sources in the watershed. Any new sources will need to obtain an allocation from the existing load allocation.

5.5 Downstream Waters

Idaho's water quality standards require that all waters "shall maintain a level of water quality at their pour point into downstream waters that provides for the attainment and maintenance of the water quality standards of those downstream waters, including waters of another state or tribe" (IDAPA 58.01.02.070.08). All of the AUs where TMDLs were developed here are part of watersheds that ultimately drain into the Nez Perce Reservation boundary (Figure 1). DEQ believes the TMDLs developed here for stream segments outside the reservation are also protective of water quality downstream within the reservation. The Nez Perce Tribe does not currently have its own water quality standards because EPA has not granted the tribe *treatment as state* status for implementing the CWA. However, DEQ, Nez Perce Tribe, and EPA jointly developed an *E. coli* TMDL for Threemile Creek that applied to segments both inside and outside the reservation boundary (DEQ 2004). The TMDL will continue to apply to stream segments within the reservation boundary. The TMDLs developed here are more protective than the existing Threemile Creek *E. coli* TMDLs that apply to tribal waters. The *E. coli* TMDLs developed here use the same target concentration as used to develop the Threemile Creek *E. coli* TMDL but also include a 10% explicit rather than implicit MOS.

5.6 Implementation Strategies

The *Cottonwood Creek TMDL Implementation Plan for Agriculture* and *South Fork Clearwater TMDL Implementation Plan for Agriculture* (ISWCC 2005) previously identified implementation needs and priority areas. These documents identified a need for fencing and off-stream watering facilities to exclude livestock from streams. The plans also recommended agricultural management practices to reduce sediment loads because such practices will also decrease bacteria loads to streams (ISWCC 2005). Practices that reduce livestock access to streams and reduce sediment loads are still needed.

Monitoring is also critical for guiding implementation efforts and ensuring the limited financial resources available for implementation are used as effectively as possible. Previous implementation plans recommended establishing long-term monitoring sites, conducting routine monitoring multiple times per year, and conducting an *E. coli* DNA fingerprinting study to identify *E. coli* contamination sources (ISWCC 2005). The NPTWR, Idaho Association of Soil Conservation Districts, and DEQ have periodically monitored *E. coli* on the Camas Prairie, and multiple years of *E. coli* data are available at some sites. A thorough *E. coli* deoxyribonucleic

acid (DNA) fingerprinting study has not been completed, and the relative contribution of different *E. coli* sources has not been identified. Priorities should include coordinating *E. coli* monitoring across agencies, securing the financial resources needed to identify sources more specifically, and continuing monitoring efforts, which are critical for informing and guiding implementation.

DEQ recognizes that implementation strategies for TMDLs may need to be modified if monitoring shows that TMDL goals are not being met or significant progress is not being made toward achieving the goals. Reasonable assurance (section 5.4.3) for the TMDL to meet water quality standards is based on the implementation strategy.

5.6.1 Time Frame

The time frame needed to achieve the *E. coli* water quality standard within each AU depends on the *E. coli* sources, their extent and spatial distribution, and stakeholder commitment to implementation strategies. If livestock are a significant *E. coli* source, installing fencing to limit livestock stream access and off-stream watering can cause immediate water quality improvements. The availability of landowners to implement voluntary BMPs and funding to finance BMP installations affect whether these changes occur within the time frame. If livestock are not the primary source, the time frame can be more difficult to predict and may be longer.

5.6.2 Approach

Idaho Code §39-3602(9) identifies the Idaho Soil and Water Conservation Commission (ISWCC) as the designated management agency for addressing nonpoint source pollution from grazing and agriculture. Idaho Code §39-3611(10) requires state agencies to work with landowners to implement agriculture BMPs on a voluntary basis. ISWCC, in coordination with other stakeholders such as the Idaho County Conservation District, is responsible for reviewing and updating existing implementation plans for agriculture, and working with landowners to implement agricultural BMPs necessary to meet water quality standards. Funding provided under the CWA §319 and other funds will be used to encourage voluntary projects to reduce nonpoint source pollution.

To guide agricultural implementation efforts, the ISWCC, DEQ, South Fork Clearwater WAG, and stakeholders should collaboratively develop a monitoring plan to identify pollutant sources, guide implementation efforts, and monitor water quality changes.

5.6.3 Responsible Parties

DEQ and the designated management agencies in Idaho have primary responsibility for overseeing implementation in cooperation with landowners and managers. In Idaho, these agencies, and their federal and state partners, are charged by the CWA to lend available technical assistance and other appropriate support to local efforts for water quality improvements. Designated state agencies are responsible for assisting with preparation of specific implementation plans, particularly for those resources for which they have regulatory authority or programmatic responsibilities:

- Idaho Department of Lands for timber harvest, oil and gas exploration and development, and mining

- Idaho Soil and Water Conservation Commission for grazing and agricultural activities
- Idaho Transportation Department for public road construction
- Idaho State Department of Agriculture for aquaculture
- DEQ for all other activities

In addition to the designated management agencies, the public—through the WAG and other equivalent organizations or processes—will have opportunities to be involved in developing the implementation plan to the maximum extent practical. Public participation will significantly affect public acceptance of the document and the proposed control actions. Stakeholders (e.g., landowners, local governing authorities, taxpayers, industries, and land managers) are the most educated regarding the pollutant sources and will be called upon to identify the most appropriate control actions for each area. Experience has shown that the most effective implementation plans are those developed with substantial public cooperation and involvement.

5.6.4 Implementation Monitoring Strategy

Monitoring is critical for guiding implementation efforts and ensuring the limited financial resources available for implementation are used as effectively as possible. Two types of monitoring are needed: *pollutant characterization monitoring* to better characterize pollutant sources, their relative contribution, and spatial distribution and guide implementation efforts; and *implementation effectiveness monitoring* that documents pollutant reductions from implementation projects through monitoring pollutants before and after an implementation projects.

DEQ recommends that DEQ, NPTWR, Idaho County Soil and Water Conservation District, and ISWCC collaboratively develop an interagency *E. coli* monitoring plan. Because monitoring data will be used by the Idaho County Soil and Water Conservation District and ISWCC to identify where BMPs are needed, inform the design of conservation projects, and promote voluntary action by landowners, the monitoring plan should be designed with input from these users, and with their needs in mind. Feedback between monitoring and implementation efforts is critical for achieving water quality goals.

The monitoring plan should include the following:

- Prioritized list of *pollutant characterization monitoring* needed to identify pollutant sources, their relative contribution, and spatial distribution
- Prioritized list of *implementation effectiveness monitoring* needs to document pollutant reductions from specific BMP types or projects and overall efforts.
- Field sampling and analytical methods, to promote consistency across agencies, and ensure collected data are useable for CWA decision-making.
- Data management processes; make all data collected under the plan publicly available through the Water Quality Portal (*www.waterqualitydata.us*), and document processes for updating the SF-CLEAR database.
- Roles and responsibilities of each agency.
- Estimated monitoring costs.
- Performance measures to track progress towards meeting monitoring goals.

Once developed, the plan should be presented to the South Fork Clearwater WAG for review and approval. Results from monitoring conducted under the plan will be used by the cooperating parties to guide and prioritize implementation efforts.

6 Threemile Creek TMDL Review

DEQ reviewed the existing *E. coli* TMDL for Threemile Creek (ID17060305CL010_02) established through the South Fork Clearwater River subbasin TMDLs (DEQ 2004). Idaho Code §39-3611(7) requires a 5-year cyclic review process for Idaho TMDLs:

> The director shall review and reevaluate each TMDL, supporting subbasin assessment, implementation plan(s) and all available data periodically at intervals of no greater than five (5) years. Such reviews shall include the assessments required by section 39-3607, Idaho Code, and an evaluation of the water quality criteria, instream targets, pollutant allocations, assumptions and analyses upon which the TMDL and subbasin assessment were based. If the members of the watershed advisory group, with the concurrence of the basin advisory group, advise the director that the water quality standards, the subbasin assessment, or the implementation plan(s) are not attainable or are inappropriate based upon supporting data, the director shall initiate the process or processes to determine whether to make recommended modifications. The director shall report to the legislature annually the results of such reviews.

6.1 Threemile Creek Description

Threemile Creek begins in forested headwaters at approximately 5,200 feet above sea level and flows downstream through agricultural land and the city of Grangeville before entering the Nez Perce Reservation and descending through a canyon, where it discharges into the South Fork Clearwater River at approximately 1,400 feet above sea level.

Figure 16 shows *E. coli* concentration patterns across years in Threemile Creek. All sites in Figure 16 except the mouth are located outside the reservation boundary within AU ID17060305CL010_02. Available data were collected by DEQ in 2019 or by NPTWR from 2011 to 2012. *E. coli* concentrations were consistently low within the forested headwaters but exceeded Idaho's *E. coli* criterion both upstream and downstream of the City of Grangeville WWTP in 2019. Section 2.3.2 provides 2019 monitoring site photos and geometric mean results. Section 4.1 describes past *E. coli* pollution control efforts within the watershed. Through a grant-funded project that addressed both Threemile Creek and Butcher Creek (Table 8), 37,680 linear feet of fencing and 11 off-stream watering facilities were installed, and 9 livestock heavy use pads were installed.

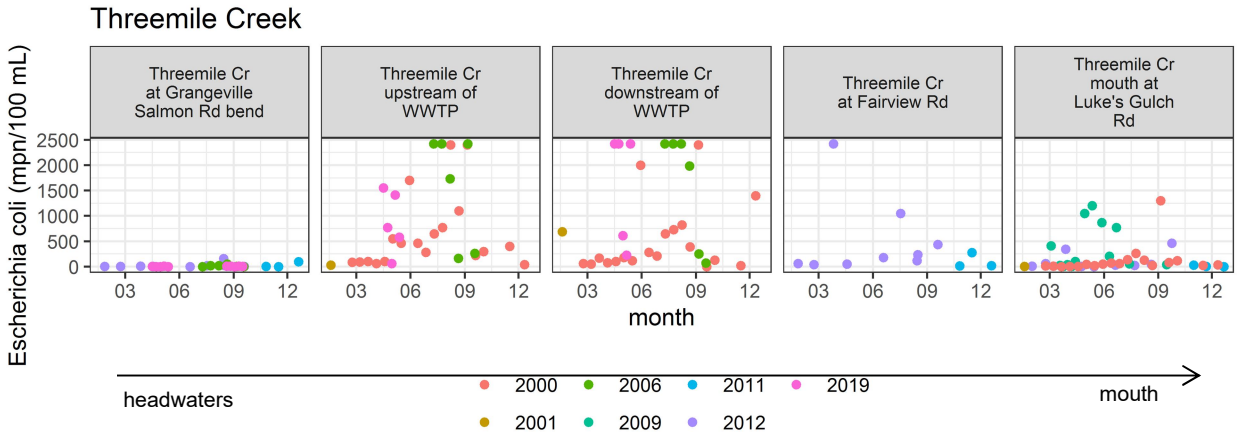

Figure 16. *E. coli* concentration patterns in Threemile Creek.

6.2 *E. coli* TMDL Summary

The Threemile Creek *E. coli* TMDL was developed in 2004 prior to implementation of DEQ's tribal waters policy. The TMDL addressed segments of Threemile Creek both inside and outside the Nez Perce Reservation boundary. The TMDL included two AUs: ID17060305CL010_02, and ID17060305CL010_03 (Table 1). The TMDL defined an instantaneous target of 576 mpn/100 mL and a 30-day geometric mean target of 126 mpn/100 mL based on Idaho's *E. coli* criterion (DEQ 2004). These targets were applied year-round.

The Threemile Creek *E. coli* TMDL developed load and wasteload allocations for specific sections of Threemile Creek based on stream flows observed in August and September, when *E. coli* concentrations were observed to be highest during the 2000–2001 monitoring. Table 12 shows Threemile Creek *E. coli* load and wasteload allocations (reproduced from DEQ 2004, Table 36).

6.3 Recommendations

DEQ believes the existing *E. coli* TMDL for Threemile Creek is still appropriate and does not need to be revised. This conclusion applies only to Threemile Creek segments outside the reservation boundary. The targets and load allocations are based on Idaho's current *E. coli* criterion. In addition, the TMDL defined load allocations specifically for stream segments outside the reservation boundary (Table 12), so it is consistent with DEQ's tribal policy. DEQ should continue to quantify *E. coli* geometric means within Threemile Creek segments outside the reservation to monitor progress towards meeting water quality goals. Considering concentrations exceeded the *E. coli* criterion in 2019, pollution control efforts documented in section 4.1 have not been sufficient to achieve water quality goals at monitored sites outside the headwaters. Implementation strategies described above should be applied to Threemile Creek.

Table 12. *E. coli* nonpoint source allocations and wasteload allocations for Threemile Creek.

Location	Target (mpn/100 mL)	Allocation Type	Critical Flow (cfs)	E. coli Concentration (mpn/100 mL)	E. coli Current Load (mpn/day)	E. coli Load Capacity (mpn/day)	E. coli Allocation (mpn/day)	E. coli Allocation (mpn/100 mL)	E. coli Load Reduction (%)
Headwaters to Grangeville WWTP outfall	126	NPS-LA	0.71	1530	2.7E+10	2.2E+09	2.2E+09	126—monthly geometric mean 576—daily maximum	92
Grangeville WWTP outfall to Nez Perce Reservation	126	NPS-LA	0.71	903	1.6E+10	2.2E+09	2.2E+09	126—monthly geometric mean 576—daily maximum	86
	126	PS-WLA Grangeville WWTP	0.89	53	1.2E+09	2.7E+09	2.7E+09	126—monthly geometric mean 576—daily maximum	0.0
Nez Perce Reservation boundary to mouth	126	NPS-LA	1.54	196	7.4E+09	4.7E+09	4.7E+09	126—monthly geometric mean 576—daily maximum	36

Notes: nonpoint source load allocation (NPS-LA); point source waste load allocation (PS-LA)

7 Conclusions

Between 2017 and 2019, DEQ collected *E. coli* data at 72 sites across 62 AUs within the South Fork Clearwater River subbasin; all sites were outside the Nez Perce Reservation boundary. Monitoring methods and results are documented in detail in the *Escherichia coli Patterns in the South Fork Clearwater Subbasin* (DEQ 2020). Based on available data, DEQ identified six AUs where *E. coli* concentrations exceeded Idaho's *E. coli* criterion, and DEQ determined contact recreation use is impaired. This document addresses these six AUs.

For three of the six AUs (Cottonwood Creek, ID17060305CL003_04; Stockney Creek, ID17060305CL006_03; Shebang Creek ID17060305CL007_03), a fecal coliform TMDL was previously developed in the Cottonwood Creek TMDLs (DEQ 2000). Since then, Idaho's water quality standards have changed; the fecal coliform criterion has been replaced with an *E. coli* criterion. Recent monitoring indicated these AUs are impaired by *E. coli,* so *E. coli* TMDLs were developed to replace the fecal coliform TDMLs.

For Sally Ann Creek (AUs ID17060305CL081_02 and ID17060305CL081_03), contact recreation use had not previously been assessed, but *E. coli* concentrations exceeded Idaho's *E. coli* criterion, so DEQ developed *E. coli* TMDLs.

For Threemile Creek (AU ID17060305CL010_02), DEQ previously developed an *E. coli* TMDL in South Fork Clearwater River subbasin TMDLs (DEQ 2004). For this AU, DEQ conducted a

TMDL review as required by Idaho Code §39-3611(7). DEQ believes the existing *E. coli* TMDL for the Threemile Creek (AU ID17060305CL010_02) is still appropriate. This AU is still impaired by *E. coli,* and the TMDL does not need to be revised.

For these TMDLs and TMDL review, DEQ implemented the tribal waters policy developed in response to requests from Idaho Indian tribes and EPA (DEQ 2016). DEQ split AUs at the Nez Perce Reservation boundary. AUs wholly within reservation boundaries after the split were labeled tribal waters in the 2018/2020 Integrated Report (DEQ 2020a) and placed in Category 3t with all beneficial uses unassessed. DEQ will not sample, assess support of beneficial uses, or develop TMDLs for waters within tribal boundaries unless EPA and Nez Perce Tribe give DEQ written permission, such as through a memorandum of agreement. The *E. coli* TMDLs were developed only for stream segments outside the Nez Perce Reservation boundary (Figure 1), consistent with Idaho's tribal waters policy (DEQ 2018). DEQ's TMDL review for Threemile Creek (ID17060305CL010_02) and conclusions apply only to stream segments outside the Nez Perce Reservation boundary (Figure 1), consistent with Idaho's tribal waters policy (DEQ 2018).

DEQ's contact recreation use support decisions for all 62 AUs monitored 2017-2019 are summarized in this document. They were documented in detail, reviewed by the South Fork Clearwater River Watershed Advisory Group (WAG), made available for public comment, and submitted to EPA for approval through Idaho's 2018/2020 Integrated Report. EPA must review and approve DEQ's support assessment decisions before they become final, but EPA cannot do so by reviewing and approving this TMDL document; the CWA requires EPA to review and approve DEQ's support assessment calls by reviewing issuing a decision on Idaho's Integrated Report. The summary in Table 13 and Table 14 address the six AUs outside the Nez Perce Reservation boundary that were identified as impaired by *E. coli*.

Table 13. Summary of assessment outcomes for AUs where an existing bacteria TMDL was updated or reviewed.

Assessment Unit Name	Assessment Unit Number	Pollutant	TMDL(s) Completed	Recommended Changes to 2022 Integrated Report	Justification
Cottonwood Creek – source to Cottonwood Creek waterfall	003_04	*E. coli*	Yes	Place contact recreation use in IR Category 4a (impaired with approved TMDL) due to *E. coli* impairment.	*E. coli* impairment identified and TMDL completed. *E. coli* TMDL replaces 2000 fecal coliform TMDL.
Stockney Creek – source to mouth	006_03	*E. coli*	Yes	Place contact recreation use in IR Category 4a (impaired with approved TMDL) due to *E. coli* impairment.	*E. coli* impairment identified and TMDL completed. *E. coli* TMDL replaces 2000 fecal coliform TMDL.
Shebang Creek – source to mouth	007_03	*E. coli*	Yes	Place contact recreation use in IR Category 4a (impaired with approved TMDL) due to *E. coli* impairment.	*E. coli* impairment identified and TMDL completed. *E. coli* TMDL replaces 2000 fecal coliform TMDL.
Threemile Creek	010_02	*E. coli*	No (TMDL review)	No change; retain in Category 4a for *E. coli.*	The AU is still impaired by *E. coli,* and the previously-developed TMDL is still appropriate.

Note: All assessment unit numbers begin with ID7060305CL.

Table 14. Summary of assessment outcomes assessment units that did not have an existing bacteria TMDL.

Assessment Unit Name	Assessment Unit Number	Pollutant	TMDL(s) Completed	Recommended Changes to 2022 Integrated Report	Justification
Sally Ann Creek – source to and inc. Wall Creek [a]	081_02	*E. coli*	Yes	Place contact recreation use in IR Category 4a (impaired with approved TMDL) due to *E. coli* impairment.	*E. coli* impairment previously identified; TMDL completed.
Sally Ann Creek – Wall Creek to mouth [b]	081_03	*E. coli*	Yes	Place contact recreation use in IR Category 4a (impaired with approved TMDL) due to *E. coli* impairment.	New *E. coli* impairment identified and TMDL completed; unlisted but impaired.

Note: All assessment unit numbers begin with ID17060305CL.
a: contact recreation use newly listed as impaired by *E. coli* (Category 5) in Idaho's 2018/2020 Integrated Report.
b. contact recreation use unassessed in Idaho's 2018/2020 Integrated Report. AU recently identified as impaired based on 2020 monitoring data and TMDL developed.

This document was prepared with input from the public, as described in Appendix D. Following the public comment period, comments and DEQ responses will be included in Appendix D, and a distribution list will be included in Appendix E.

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GIS Coverages

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errors. The Department of Environmental Quality may update, modify, or revise the data used at any time, without notice.

Glossary

§303(d)

Refers to section 303 subsection "d" of the Clean Water Act. Section 303(d) requires states to develop a list of water bodies that do not meet water quality standards. This section also requires total maximum daily loads (TMDLs) be prepared for listed waters. Both the list and the TMDLs are subject to United States Environmental Protection Agency approval.

Assessment Unit (AU)

A group of similar streams that have similar land use practices, ownership, or land management. However, stream order is the main basis for determining AUs. All the waters of the state are defined using AUs, and because AUs are a subset of water body identification numbers, they tie directly to the water quality standards so that beneficial uses defined in the water quality standards are clearly tied to streams on the landscape.

Beneficial Use

Any of the various uses of water that are recognized in water quality standards, including, but not limited to, aquatic life, recreation, water supply, wildlife habitat, and aesthetics.

Beneficial Use Reconnaissance Program (BURP)

A program for conducting systematic biological and physical habitat surveys of water bodies in Idaho. BURP protocols address lakes, reservoirs, and wadeable streams and rivers.

Exceedance

A violation (according to DEQ policy) of the pollutant levels permitted by water quality criteria.

Fully Supporting

In compliance with water quality standards and within the range of biological reference conditions for all designated and existing beneficial uses as determined through the *Water Body Assessment Guidance* (DEQ 2016).

Load Allocation (LA)

A portion of a water body's load capacity for a given pollutant that is given to a particular nonpoint source (by class, type, or geographic area).

Load

The quantity of a substance entering a receiving stream, usually expressed in pounds or kilograms per day or tons per year. Load is the product of flow (discharge) and concentration.

Load Capacity (LC)

How much pollutant a water body can receive over a given period without causing violations of state water quality standards. Upon allocation to various sources, a margin of safety, and natural background contributions, it becomes a total maximum daily load.

Margin of Safety (MOS)

An implicit or explicit portion of a water body's load capacity set aside to allow for uncertainly about the relationship between the pollutant loads and the quality of the receiving water body. The margin of safety is a required component of a total maximum daily load (TMDL) and is often incorporated into conservative assumptions used to develop the TMDL (generally within the calculations and/or models). The margin of safety is not allocated to any sources of pollution.

Nonpoint Source	A dispersed source of pollutants generated from a geographical area when pollutants are dissolved or suspended in runoff and then delivered into waters of the state. Nonpoint sources are without a discernable point or origin. They include, but are not limited to, irrigated and nonirrigated lands used for grazing, crop production, and silviculture; rural roads; construction and mining sites; log storage or rafting; and recreation sites.
Not Assessed (NA)	A concept and an assessment category describing water bodies that have been studied but are missing critical information needed to complete an assessment.
Not Fully Supporting	Not in compliance with water quality standards or not within the range of biological reference conditions for any beneficial use as determined through the *Water Body Assessment Guidance* (DEQ 2016).
Point Source	A source of pollutants characterized by having a discrete conveyance, such as a pipe, ditch, or other identifiable "point" of discharge into a receiving water. Common point sources of pollution are industrial and municipal wastewater plants.
Pollutant	Generally, any substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems.
Pollution	A very broad concept that encompasses human-caused changes in the environment that alter the functioning of natural processes and produce undesirable environmental and health effects. Pollution includes human-induced alteration of the physical, biological, chemical, and radiological integrity of water and other media.
Stream Order	Hierarchical ordering of streams based on the degree of branching. A 1st-order stream is an unforked or unbranched stream. Under Strahler's (1957) system, higher-order streams result from the joining of two streams of the same order.
Total Maximum Daily Load (TMDL)	A TMDL is a water body's load capacity after it has been allocated among pollutant sources. It can be expressed on a time basis other than daily if appropriate. Sediment loads, for example, are often calculated on an annual basis. A TMDL is equal to the load capacity, such that load capacity = margin of safety + natural background + load allocation + wasteload allocation = TMDL. In common usage, a TMDL also refers to the written document that contains the statement of loads and supporting analyses, often incorporating TMDLs for several water bodies and/or pollutants within a given watershed.
Wasteload Allocation (WLA)	The portion of receiving water's load capacity that is allocated to one of its existing or future point sources of pollution. Wasteload allocations specify how much pollutant each point source may release to a water body.
Water Body	A stream, river, lake, estuary, coastline, or other water feature, or portion thereof.

Water Quality Criteria	Levels of water quality expected to render a body of water suitable for its designated uses. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, aquatic habitat, or industrial processes.
Water Quality Standards	State-adopted and United States Environmental Protection Agency-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.

Appendix A. Beneficial Uses

Idaho's water quality standards (IDAPA 58.01.02) list beneficial uses and set water quality goals for waters of the state. Idaho's water quality standards require that surface waters of the state be protected for beneficial uses, wherever attainable (IDAPA 58.01.02.050.02). These beneficial uses are interpreted as existing uses, designated uses, and presumed uses.

Existing Uses

Existing uses under the Clean Water Act are "those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards" (40 CFR 131.3). The existing instream water uses and the level of water quality necessary to protect the uses shall be maintained and protected (IDAPA 58.01.02.051.01). Existing uses need to be protected, whether or not the level of water quality to fully support the uses currently exists. A practical application of this concept would be to apply the existing use of salmonid spawning to a water that supported salmonid spawning since November 28, 1975, but does not now due to other factors, such as blockage of migration, channelization, sedimentation, or excess heat.

Designated Uses

Designated uses under the Clean Water Act are "those uses specified in water quality standards for each water body or segment, whether or not they are being attained" (40 CFR 131.3). Designated uses are simply uses officially recognized by the state. In Idaho, these include uses such as aquatic life support, recreation in and on the water, domestic water supply, and agricultural uses. Multiple uses often apply to the same water; in this case, water quality must be sufficiently maintained to meet the most sensitive use (designated or existing). Designated uses may be added or removed using specific procedures provided for in state law, but the effect must not be to preclude protection of an existing higher quality use such as cold water aquatic life or salmonid spawning. Designated uses are described in the Idaho's water quality standards (IDAPA 58.01.02.100) and specifically listed by water body in sections 110–160.

Undesignated Surface Waters and Presumed Use Protection

In Idaho, due to a change in scale of cataloging waters in 2000, most water bodies listed in the tables of designated uses in the water quality standards do not yet have specific use designations (IDAPA 58.01.02.110–160). The water quality standards have three sections that address nondesignated waters. Sections 101.02 and 101.03 specifically address nondesignated man-made waterways and private waters. Man-made waterways and private waters have no presumed use protections. Man-made waters are protected for the use for which they were constructed unless otherwise designated in the water quality standards. Private waters are not protected for any beneficial uses unless specifically designated in the water quality standards.

All other undesignated waters are addressed by section 101.01. Under this section, absent information on existing uses, DEQ presumes that most Idaho waters will support cold water aquatic life and either primary or secondary contact recreation (IDAPA 58.01.02.101.01). To

protect these so-called presumed uses, DEQ applies the numeric cold water and recreation criteria to undesignated waters. If in addition to presumed uses, an additional existing use (e.g., salmonid spawning) exists, then the additional numeric criteria for salmonid spawning would also apply (e.g., intergravel dissolved oxygen, temperature) because of the requirement to protect water quality for that existing use. However, if some other use that requires less stringent criteria for protection (such as seasonal cold aquatic life) is found to be an existing use, then a use designation (rulemaking) is needed before that use can be applied in lieu of cold water criteria (IDAPA 58.01.02.101.01).

Appendix B. State and Site-Specific Water Quality Standards and Criteria

Table B1. Selected numeric criteria supportive of designated beneficial uses in Idaho's water quality standards.

Parameter	Primary Contact Recreation	Secondary Contact Recreation	Cold Water Aquatic Life	Salmonid Spawning[a]
Water Quality Standards: IDAPA 58.01.02.250–251				
Bacteria				
• Geometric mean	<126 *E. coli*/100 mL[b]	<126 *E. coli*/100 mL	—	—
• Single sample	≤406 *E. coli*/100 mL	≤576 *E. coli*/100 mL	—	—

[b] *Escherichia coli* per 100 milliliters

Appendix C. Data Sources

Data sources used in this document are described in *Escherichia Coli Patterns in the South Fork Clearwater River Subbasin* (DEQ 2020). Data used are publically available through the SF-CLEAR database (*http://www.deq.idaho.gov/regional-offices-issues/lewiston/southfork-clearwater-wag/*) or Water Quality Portal (*https://www.waterqualitydata.us/*).

Appendix D. Public Participation and Public Comments

This TMDL was developed with participation from the South Fork Clearwater River Watershed Advisory Group (WAG). A draft version of this document was provided to WAG members, and was discussed in public meetings on 8-26-2020, 9-9-2020, and 9-23-2020. A draft version of this document was available for public comment October 9 through November 9, 2020. To advertise the public comment period, DEQ issued a press release, posted the comment opportunity on DEQ's website, and placed a public comment notice in the *Idaho Count Free Press.* DEQ received one public comment on the document, from USEPA Region 10.

Comment #1 (Claire Schary, USEPA Region 10, received 11/6/2020):

> The Draft TMDL's Table 9 (p. 31) appears to have significant errors. For example, the values in the Load Capacity (LC) column should be the same as the final TMDL column, per the TMDL equation presented on p. 29. Table 9 also shows the Load Allocation (LA) to be the same as the TMDL, but not the Load Capacity. As currently displayed in the table, it also contradicts the statement on p. 32: "In this TMDL, the load allocation was set based on Idaho's *E. coli* criterion and is the same as the load capacity (section 5.2)."
>
> Furthermore, the TMDL should be presented so readers can see all components add up to the TMDL. Although we cannot check the Margin of Safety (MOS) calculation, the Load Capacity load appears to be calculated correctly. However, using the 0.1 cfs flow as an example, 10% would be $3.08*10^7$, which would make the LA equal $2.77 * 10^8$ (LC – MOS), which is the value shown in Table 9 under the TMDL column, and not the LA column.
>
> Finally, EPA requests that either the Natural Background (NB) column be removed or a footnote added to Table 9 indicating that NB is included in the LA value. Although Section 5.4.4 states that "the load allocation in Table 9 includes the unquantified natural load," the presence of a NB column showing 0 in the TMDL table could be interpreted to mean it is not contributing anything and is not allowed to contribute to the LC under the TMDL.

DEQ Response:

Thank you for your comments. As described below, several columns in Table 9 have been revised in response to EPA's comments.

In table 9, the load capacity was calculated as the target x flow, as described in the equation on p 31. Table 9 load capacity calculation and values have not changed.

The margin of safety (MOS) was calculated as 10% of the load capacity (see section 5.4.1). DEQ has not changed how the MOS was calculated. However, for clarity, the values in the Table 9 MOS column were changed from '10%' to the actual mpn/day values corresponding to 10% of the load capacity.

The load allocation was calculated as the load capacity minus the MOS. In the draft document, there was a typo in the Table 9 load allocation column—incorrect exponents were used in the draft version. This has been corrected (see revised table below).

In the natural background column, 0 values were replaced with '-'. A footnote was added to Table 9 stating "natural background is included in the load allocation."

The 'TMDL' column has been removed from Table 9 to prevent confusion.

On page 32, the statement, "In this TMDL, the load allocation was set based on Idaho's *E. coli* criterion and is the same as the load capacity (section 5.2)" has been corrected. It now states, "In this TMDL, the load allocation was set based on Idaho's *E. coli* criterion with the margin of safety subtracted (LA = LC-MOS)."

Table 9 (revised). *E. coli* TMDL allocations based on flow for AUs 03_04, 06_03, 07_03, 81_02, and 81_03.

Flow (ft^3/s)	Target Conc. (mpn/100 mL)	Load Capacity[a] (mpn/day)	Margin of Safety (mpn/day)	Load Allocation[b] (mpn/day)	Waste Load Allocation (mpn/day)	Natural Background (mpn/day) [c]
0.1	126	3.08×10^{8}	3.08×10^{7}	$2.77 \times 10^{~~10~~ 8}$	0	-
1.0	126	3.08×10^{9}	3.08×10^{8}	$2.77 \times 10^{~~11~~ 9}$	0	-
10.0	126	3.08×10^{10}	3.08×10^{9}	$2.77 \times 10^{~~12~~ 10}$	0	-
100	126	3.08×10^{11}	3.08×10^{10}	$2.77 \times 10^{~~13~~ 11}$	0	-

a. Flow x target; b. Load capacity – (load capacity * MOS); c: natural background is included in the load allocation; *Notes*: cubic feet per second (ft^3/s)

Appendix E. Distribution List

South Fork Clearwater Watershed Advisory Group

Clearwater Basin Advisory Group

US Environmental Protection Agency, Idaho Operations Office

Nez Perce Tribe Water Resources Division

Idaho County Soil and Water Conservation District

Idaho Soil and Water Conservation Commision

Idaho Department of Environmental Quality: DEQ State Office and Lewiston Regional Office